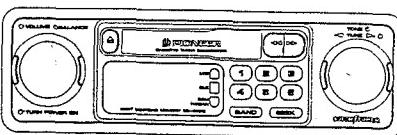


**PIONEER**  
The Art of Entertainment

# Service Manual

• KE-2828



ORDER NO.  
**CRT1331**

CASSETTE CAR STEREO WITH FM/AM ELECTRONIC TUNER

## **KE-2033**

UC, XSG/UC

## **KE-2828**

UC, ES, XSG/UC

- See the separate manual CX-197 (CRT1328) for the cassette mechanism description.

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## SAFETY INFORMATION (UC MODEL)

### **CAUTION**

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual. Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

### **WARNING**

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5). When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

## SPECIFICATIONS

### **General**

Power source .....	14.4 V DC (10.8 – 15.6 V allowable)
Grounding system .....	Negative type
Max. current consumption .....	2.5 A
Dimensions (chassis) .....	178(W) × 50(H) × 135(D) mm (nose) ..... 104(W) × 48(H) × 34(D) mm
Shaft interval .....	147 mm
Weight .....	1.3 kg

### **Amplifier**

Continuous power output is 3.2 W per channel min. into 4 ohms, both channels driven 50 to 15,000 Hz with no more than 5% THD.

#### Maximum power output

(KE-2828) ..... 8.5 W × 2 (EIAJ)

Continuous power output ..... 4.5 W × 2 (1% dist. at 1 kHz)

#### Load impedance

(KE-2828) ..... 4 Ω (2 – 8 Ω allowable)

Loudness contour ..... +8 dB (100 Hz), +4 dB (10 kHz)  
(volume: -30 dB)

### **Tape player**

Tape ..... Compact cassette tape (C-30 – C-90)  
Tape speed ..... 4.76 cm/sec. (+ 0.14 cm/sec. – 0.05 cm/sec.)

Fast forward/rewind time ..... Approx. 100 sec. for C-60

Wow & flutter ..... 0.13% (WRMS)

### Frequency response

(KE-2828) ..... 50 – 14,000 Hz (±3 dB)

Stereo separation ..... 45 dB

Signal-to-noise ratio

(KE-2828) ..... 52 dB (IEC-A network)

### **FM tuner**

Frequency range ..... 87.5 – 108 MHz

Usable sensitivity ..... 11 dBf (1.0 μV/75 Ω, mono, S/N: 30 dB)

50 dB quieting sensitivity ..... 16 dBf (1.7 μV/75 Ω, mono)

Signal-to-noise ratio ..... 70 dB (IEC-A network)

Distortion ..... 0.3% (at 65 dBf, 1 kHz, stereo)

Frequency response ..... 30 – 15,000 Hz (±3 dB)

Stereo separation ..... 40 dB (at 65 dBf, 1 kHz)

### **AM tuner**

Frequency range

(9 kHz channel step) ..... 531 – 1,602 kHz

(10 kHz channel step) ..... 530 – 1,710 kHz

Usable sensitivity ..... 18 μV (25 dB) (S/N: 20 dB)

Selectivity ..... 50 dB (±9 kHz)

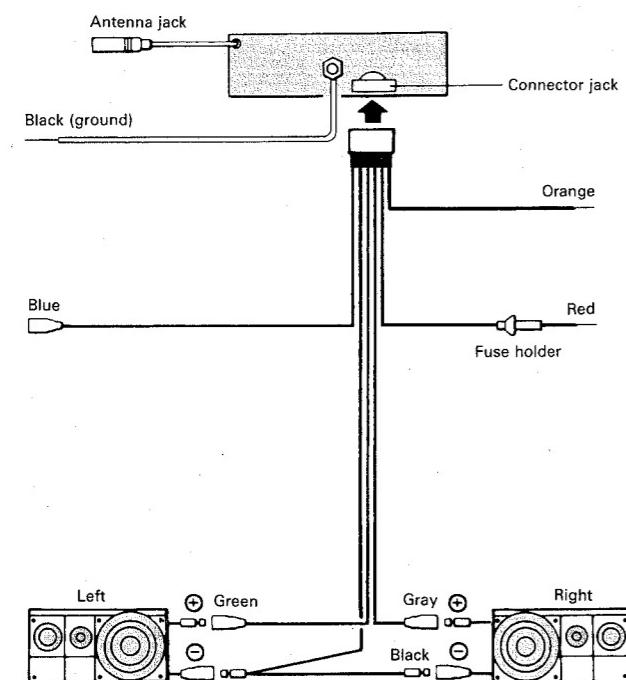
50 dB (±10 kHz)

### **Note:**

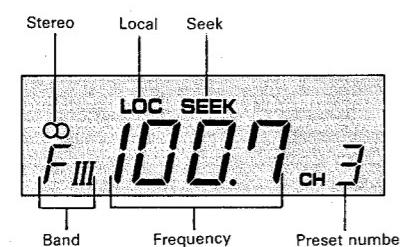
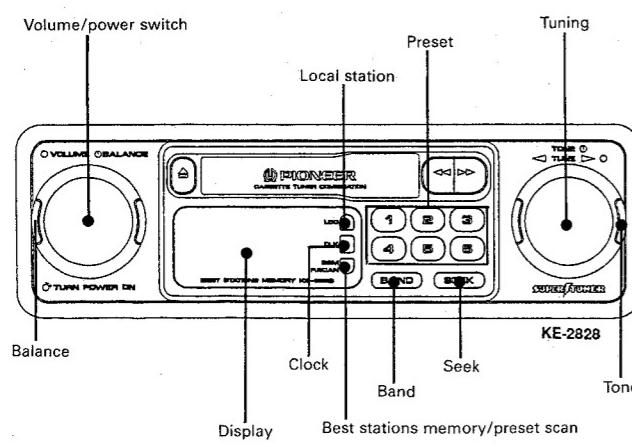
Specifications and the design are subject to possible modification without notice due to improvements.

## 1. CONNECTIONS

KE-2828



## 2. USING THE RADIO



### ● Before attempting operation...

- Set the fader control to the center position. (A click can be felt when the knob is in the center position.)
- 1. Turning the power switch to the right causes power to switch ON and the current frequency to appear on the display.
- Since the set is designed preferentially for tape play, eject a cassette tape, if mounted, before operating the radio.
- 2. Press the band switch to select the band.
- 3. Press the seek button and the seek tuning indicator will be displayed.
- 4. Turn the tuning knob to the left or right to tune in the desired frequency. (Turning to the right will increase the frequency.)
- 5. Adjust the volume and balance.
- 6. Adjust the tone.

### ● To enter a frequency into the preset memory...

- 7. Hold down one of the preset buttons (1-6) for approximately two seconds. The frequency is stored in memory (assigned to the preset button pressed) once the preset number stops flashing on the display.
- Six FM1 frequencies, six FM2 frequencies, six FM3 frequencies and six AM frequencies can be entered.

### ● Auto-Loudness

When playing back a tape or listening to the radio at low volume, the low and high tones are automatically emphasized.

### ● Clock Switch

Each press causes the display to switch between clock and frequency.

### ● Best Stations Memory Button

Automatically tunes strong frequencies and assigns them to preset buttons 1 through 6 for one-touch automatic tuning. The best stations memory function is activated by pressing this button for approximately 2 seconds. The best stations memory function is indicated by —— flashing on the display, and this function can be canceled by pressing the band switch. The frequency display returns once the best stations memory function is complete. The frequency displayed at this time is of the strongest station assigned to preset button 1 by the best stations memory function.

- 6 best (strongest) frequencies are memorized in the 6 preset buttons in the order of their strength, the strongest one being assigned to preset button 1.
- The frequencies previously assigned to the preset buttons are retained when 6 frequencies cannot be located.
- The best stations memory is in operation while —— is flashing on the display.

### ● Local Station Switch

Pressing this switch increases the seek threshold level so that only relatively strong stations can be tuned in (local indicator will illuminate on the display). Local seek threshold level can be selected among four levels for FM and two levels for AM.

Holding this switch down for approximately 2 seconds and then turning the tuning knob to the right changes the display from L-1, L-2, L-3 to L-4. Turning the tuning knob to the left changes the display from L-4, L-3, L-2 to L-1. (L-1 and L-2 for AM.) The bigger the number, the higher the seek threshold becomes and only relatively strong stations can be tuned in.

### Seek Tuning

Press the seek button, and tuning to the next higher or lower broadcast on the band can be accomplished automatically by simply turning the tuning knob to the left or right. FM frequencies change in 0.2 MHz steps while those in the AM band change in 9 kHz steps.

- AM frequencies are tuned in 10 kHz steps after the tuning steps are changed.

### Manual Tuning

When manual tuning is employed, FM frequencies change in 0.2 MHz steps while AM frequencies change in 9 kHz steps.

- AM frequencies are tuned in 10 kHz steps after the tuning steps are changed.
- 1. Press the seek button and the seek tuning indicator will disappear from the display.
- 2. Change the frequency by turning the tuning knob to the left or right. Turning the knob once will change the frequency one step (see above). Holding the tuning knob in either direction will successively change the frequency at the prescribed step.

### Preset Scan Tuning

Pressing the preset scan button (CH indicator flashes) causes previously stored frequencies to be tuned in sequentially for eight seconds each. Press again when the desired frequency is tuned in to cancel preset scan tuning.

### Preset Tuning

Pressing the preset button instantly tunes in the frequency programmed in the memory for that button.

1 2 3 4 5 6

## 3. BLOCK DIAGRAM

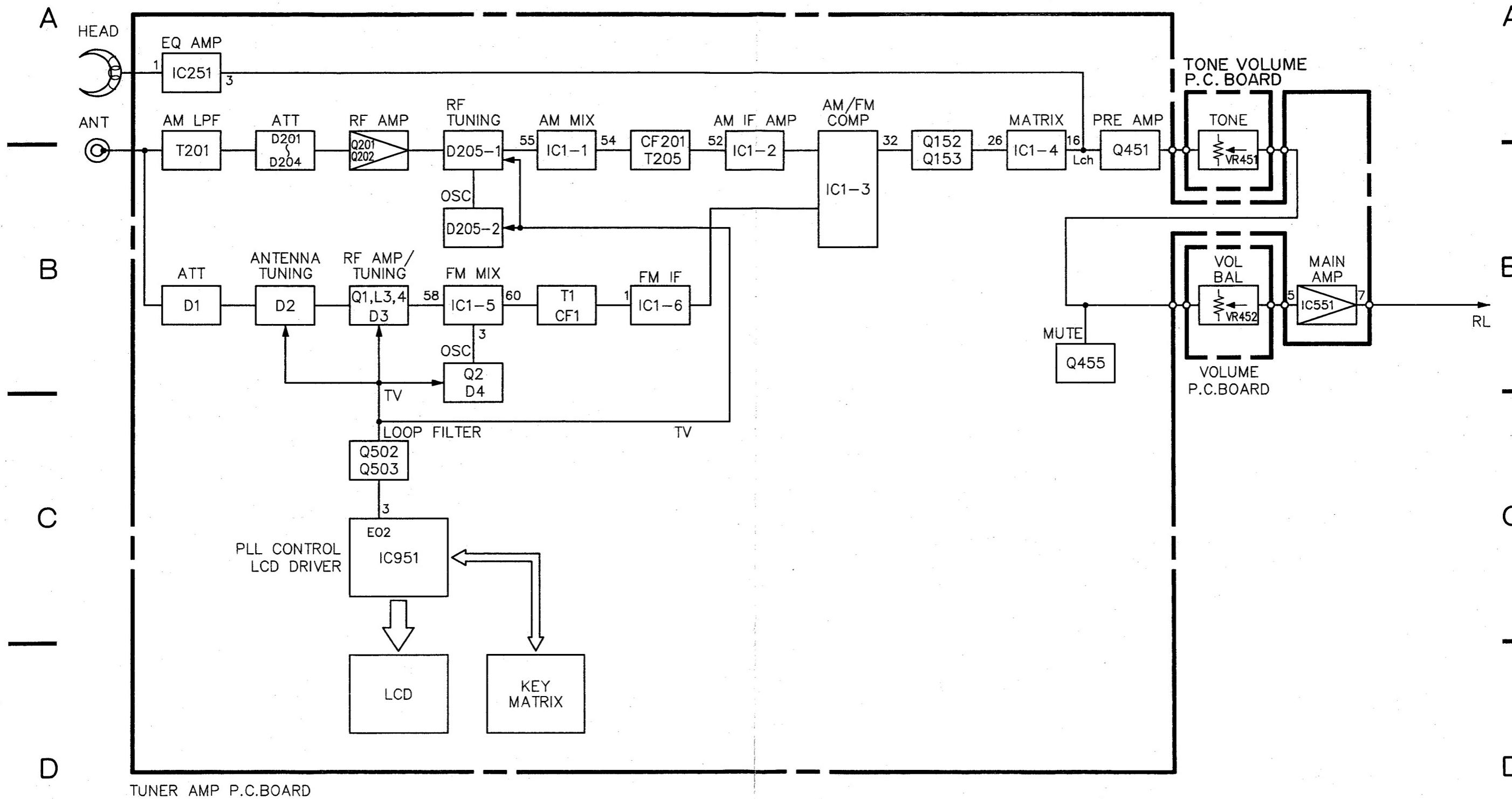


Fig. 1

5 1 2 3 4 5 6

## 4. DISASSEMBLY

- Removing the Case

1. Remove the two screws.
2. Insert and turn a screwdriver at locations indicated by arrows A to remove the case.
3. Raise the case to remove.

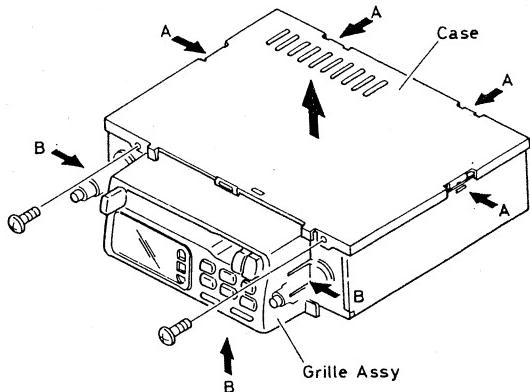


Fig. 2

- Removing the Cassette Mechanism Assy Section

1. Remove the four screws.
2. Disconnect the connector.
3. Remove the cassette mechanism assy section.

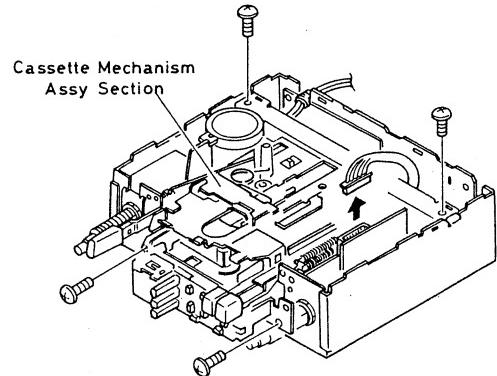


Fig. 3

- Removing the Tuner Amp P.C.Board

1. Remove the five screws and two nuts.
2. Unbend the tab indicated by arrow until straight.
3. Raise up on tuner amp P.C.board to remove it from the chassis.

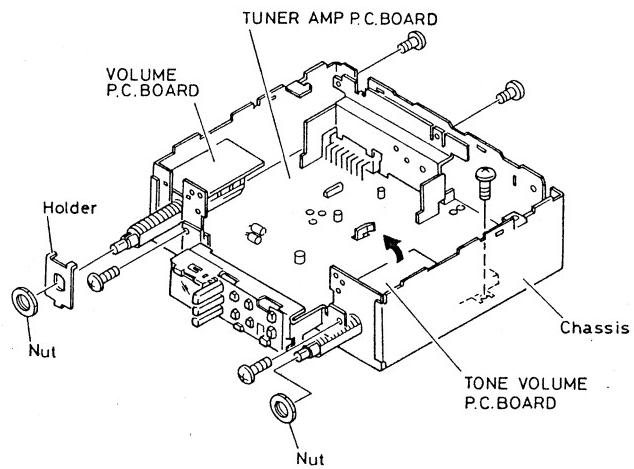


Fig. 4

## 5. ADJUSTMENT

### NOTICE:

Select C1 so that total capacity of 80pF is attained from the direction of the receiver jack.

Z: Output impedance of SSG.

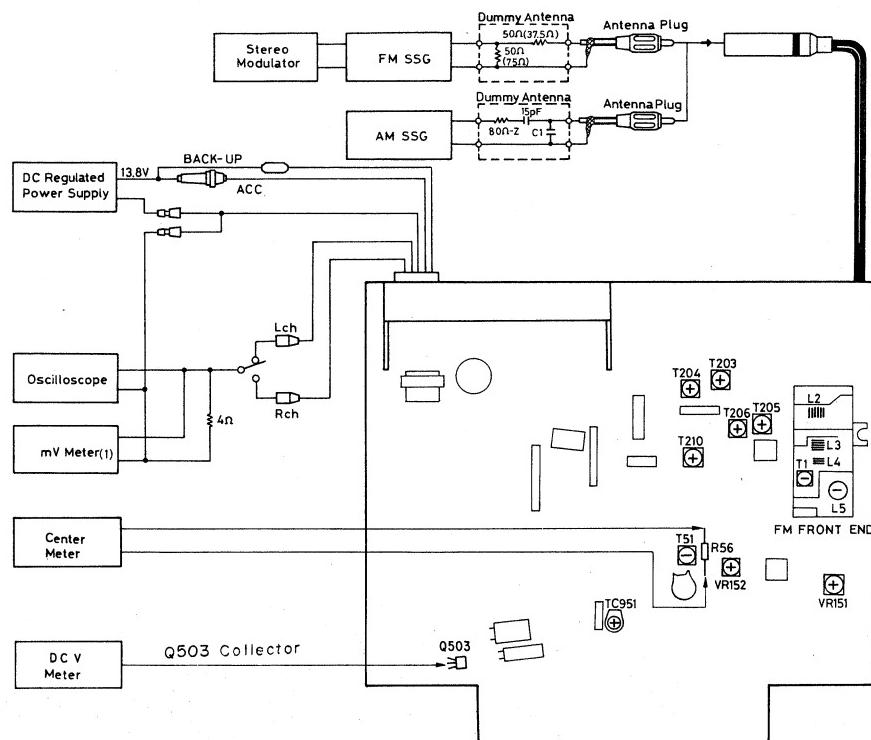


Fig. 5

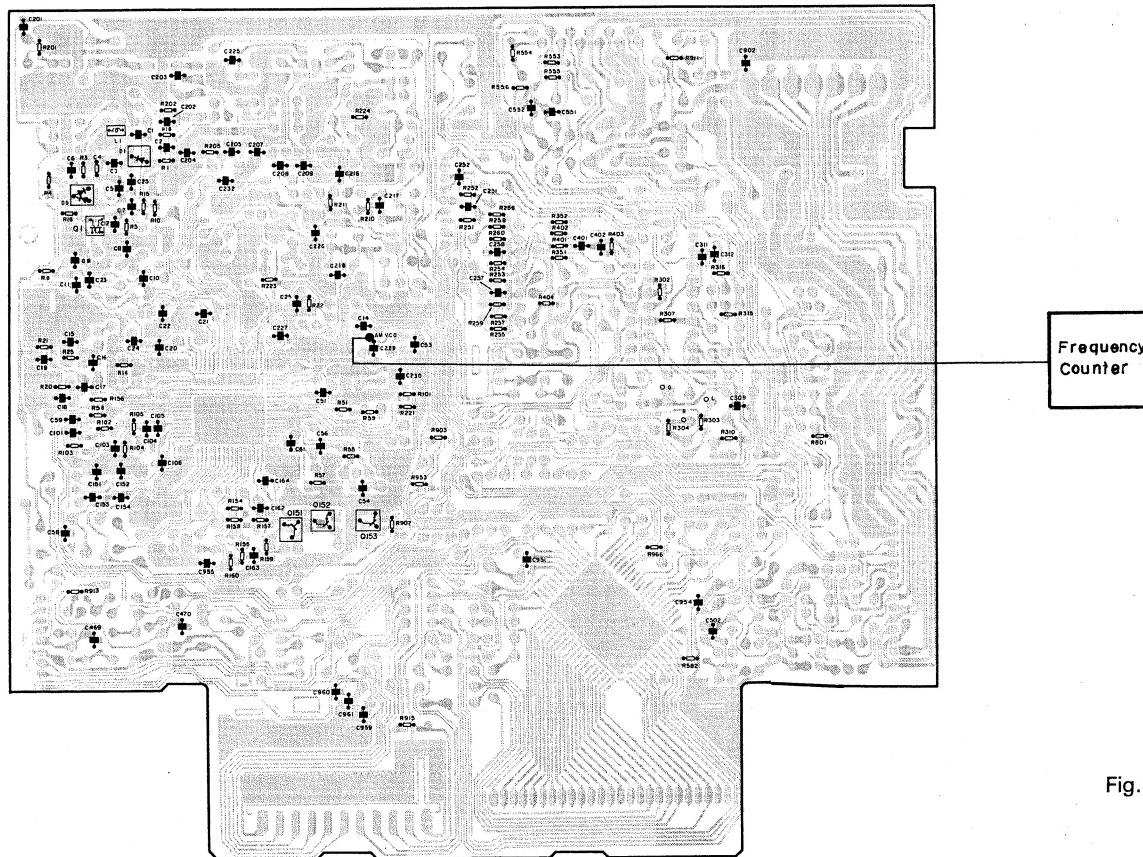


Fig. 6

## FM ADJUSTMENT

※ 1 Stereo MOD.: Pilot=10%

※ 2 Stereo MOD.: 1kHz, L+R=90%, Pilot=10%

	No.	FM SSG (400Hz, 100%)		Displayed Frequency (MHz)	Adjusting Point	Adjustment Method (Switch Position)
		Frequency (MHz)	Level (dBf)			
Tun-ing Volt	1	—	—	107.9 (US, UC) 108.0 (ES)	L5	DC V Meter: 7.0V
Tra-cking	1	98.1	15	98.1	L2, L4	mV Meter (1) : Maximum
	2	98.1	15	98.1	T1	mV Meter (1) : Maximum
IF	1	98.1 Unmodulated	65	98.1	T51	Center Meter: 0
Pil-ot Can-cell	1	98.1※ 1	65	98.1	VR151	mV Meter (1) : Minimum (MPX Filter: OFF)
ARC	1	98.1※ 2	40	98.1	VR152	mV Meter (1) : Separation 5dB

## AM ADJUSTMENT

※ 3 : ES model when tuning step at 9kHz.

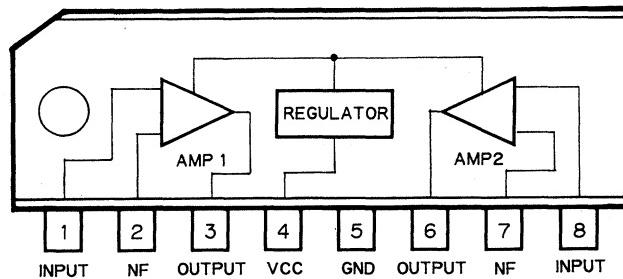
	No.	AM SSG (400Hz, 30%)		Displayed Frequency (kHz)	Adjusting Point	Adjustment Method (Switch Position)
		Frequency (kHz)	Level (dB $\mu$ V)			
Tun-ing Volt	1	—	—	530 (531)※ 3	T210	DC V Meter: 1.0V
Tra-cking	1	1,000 (999)※ 3	20	1,000 (999)※ 3	T203, 204, 205, 206	mV Meter (1) : Maximum

## CLOCK ADJUSTMENT

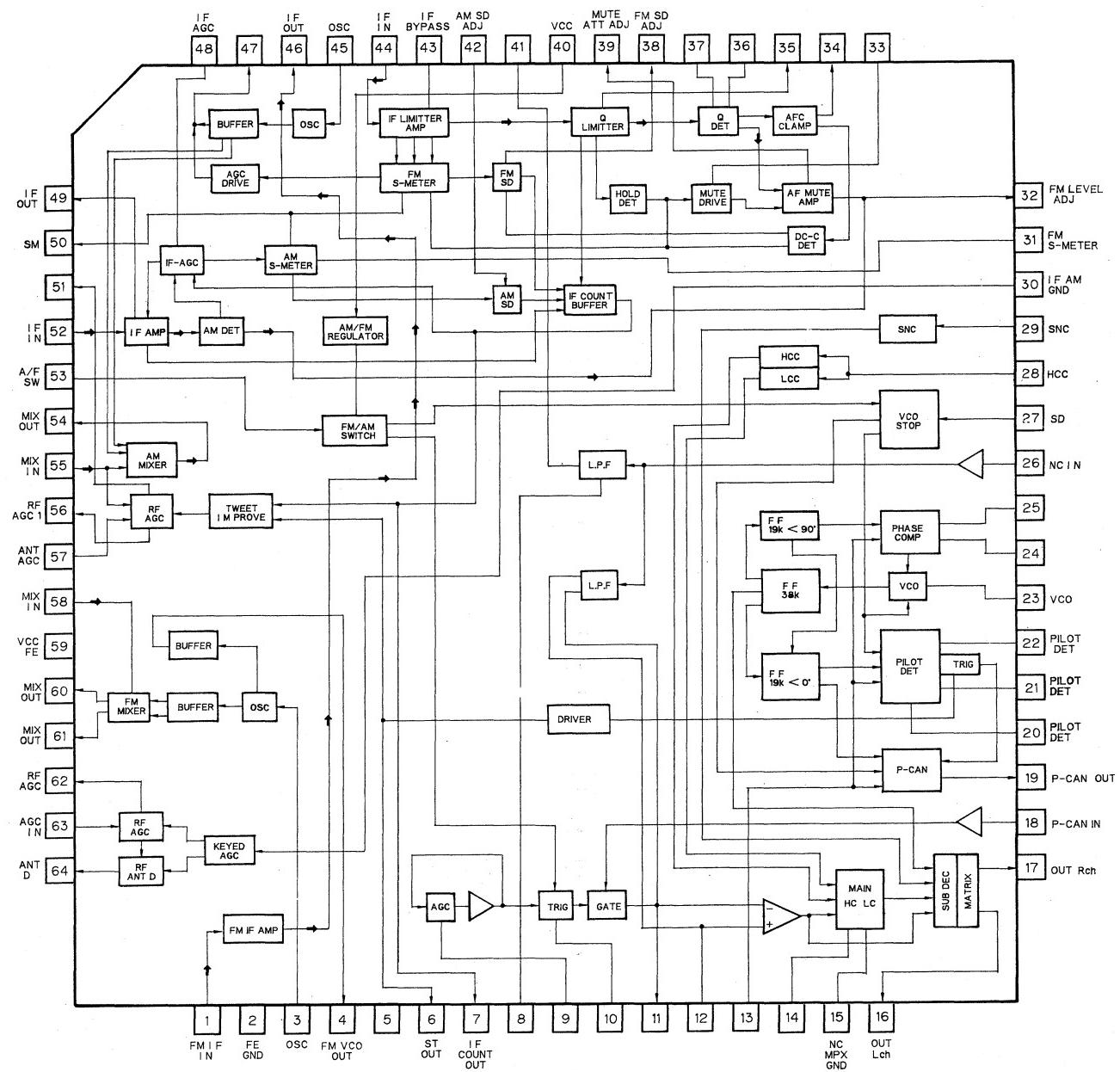
	No.	Band	Displayed Frequency (kHz)	Adjusting Point	Adjustment Method
	1	AM	1,710 (US, UC)	TC951	Frequency Counter: 2160kHz ± 40Hz
			1,602 (ES)	TC951	Frequency Counter: 2052kHz ± 40Hz

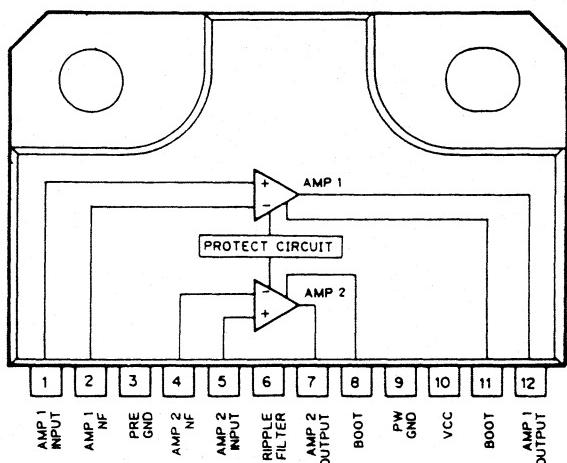
## • ICs

LA3161P



PAC001A





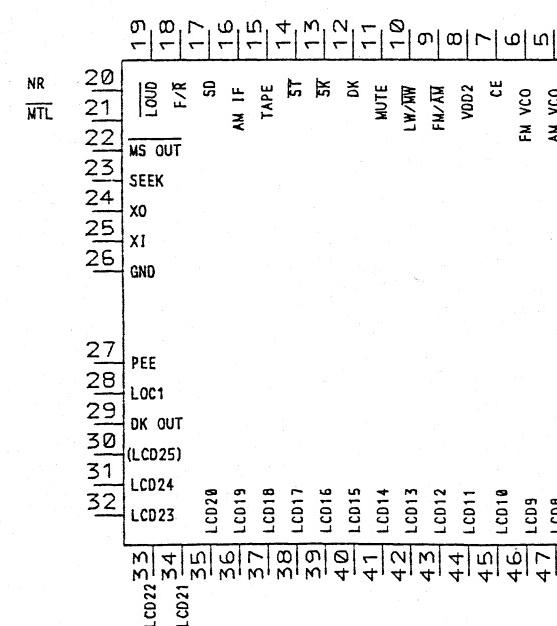
• Pin function (PD4275)

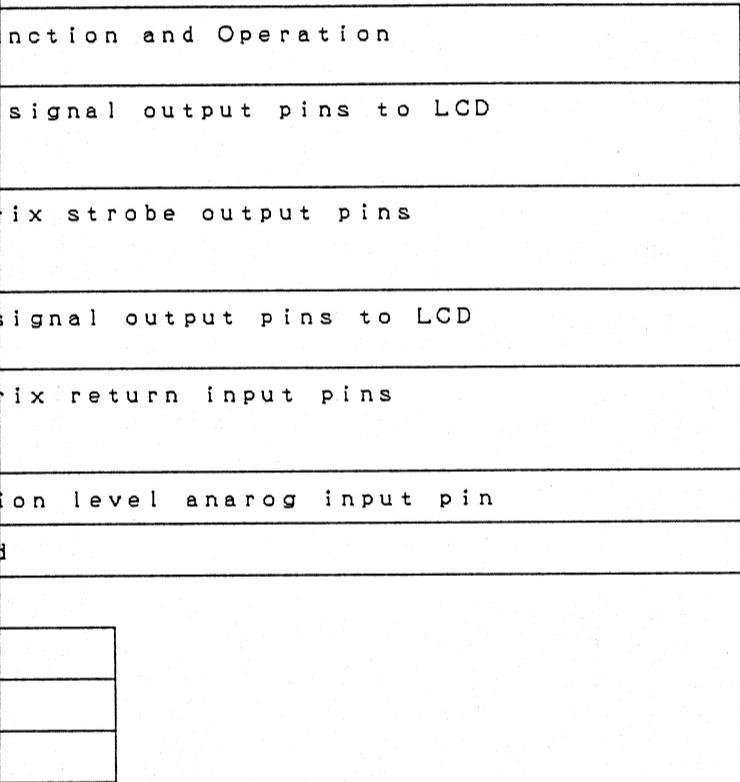
Pin No.	Pin Name	I/O	Output Format	Function and Operation
1	NC		C	Not used
2 3	EO1 EO2	Output	C(3)	PLL error output pins
4 8	VDD1 VDD2			Device power supply pin
5	AMVCO	Input		AM local oscillator signal input pin
6	FMVCO	Input		FM local oscillator signal input pin
7	CE	Input		Chip enable input pin
9	FM/AM	Output	C	FM/AM band select pin "H":FM "L":AM
10	LW/MW	Output	C	Loop filter switching output pin "H":LW
11	MUTE	Output	C	Mute output pin "H":ON
12	DK	INPUT		SK signal input pin
13	SK	INPUT		DK signal input pin
14	ST	Input		Stereo broadcast detection signal input pin "L": Stereo indicator is displayed
15	TAPE	INPUT		Tape power ON/OFF input pin "H":ON
16	AMIF	Input		AM IF signal input pin
17	SD	Input		FM SD input "H": During broadcast reception
18	F/R	Input		Tape motion signal input pin "H": Forward
19	LOUD	Input		Loudness ON/OFF signal input pin "L":ON
20	NR	Output	C	Dolby NR ON/OFF output pin "H":ON
21	MTL	Output	C	Tape METAL ON/OFF output pin "L":ON
22	MSOUT	Output	C	Tape MS ON/OFF output pin "L":ON
23	SEEK	Output	C	"H" level: SEEK, BSM, BSA and PSCAN
24 25	XO XI	Output Input	C	Quartz oscillator terminal
26	GND			GND terminal
27	PEE	Output	C	Alarm output pin
28	LOC1	Output	C	Halt sensitivity switching pin "L":DX SEEK(P. SCAN) "H":LOC SEEK
29	DKOUT	Output	C	Control by DK (terminal #12) input signal "H": DK input signal is detected as 125Hz
30	NC			Not used

Pin No.	Pin Name	I/O	Output Format	Function
31	LCD24	Output	C	Segment signal c
55	LCDO			
48	KS7	Output	C	Key matrix stro
55	KSO			
56	COM1	Output	C	Common signal o
57	COM2			
59	K3	Input		Key matrix retu
62	K0			
63	SL	Input		AM station leve
64	NC		C	Not used

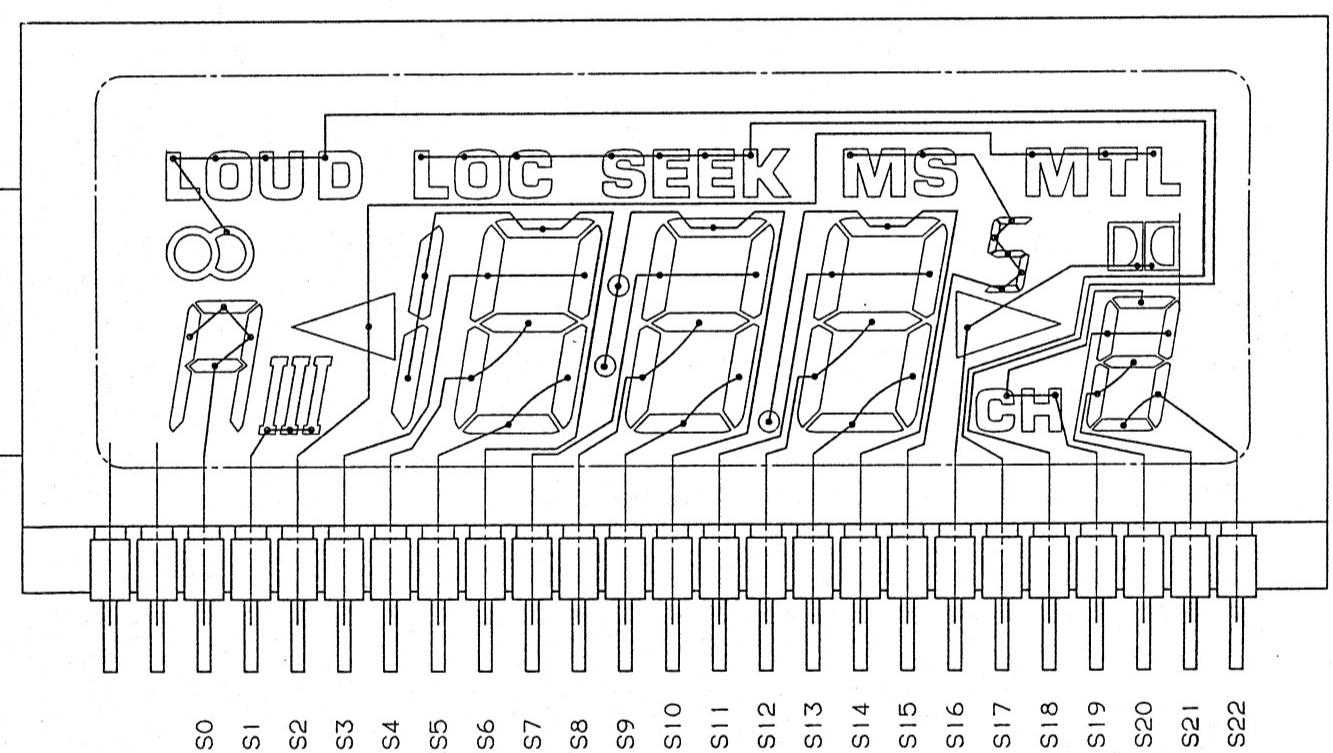
Output format	Meaning
C	C-MOS
C(3)	C-MOS (3 State)

\*PD4275





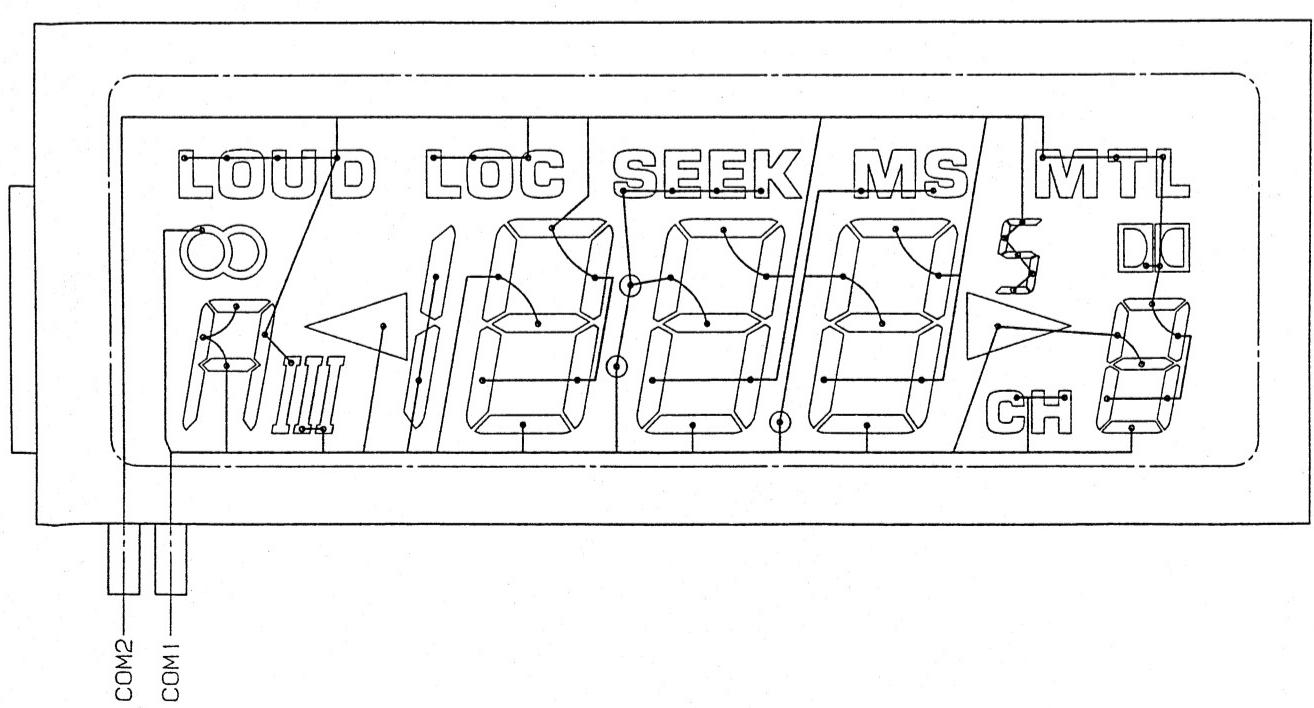
• LCD (CAW1116)  
SEGMENT



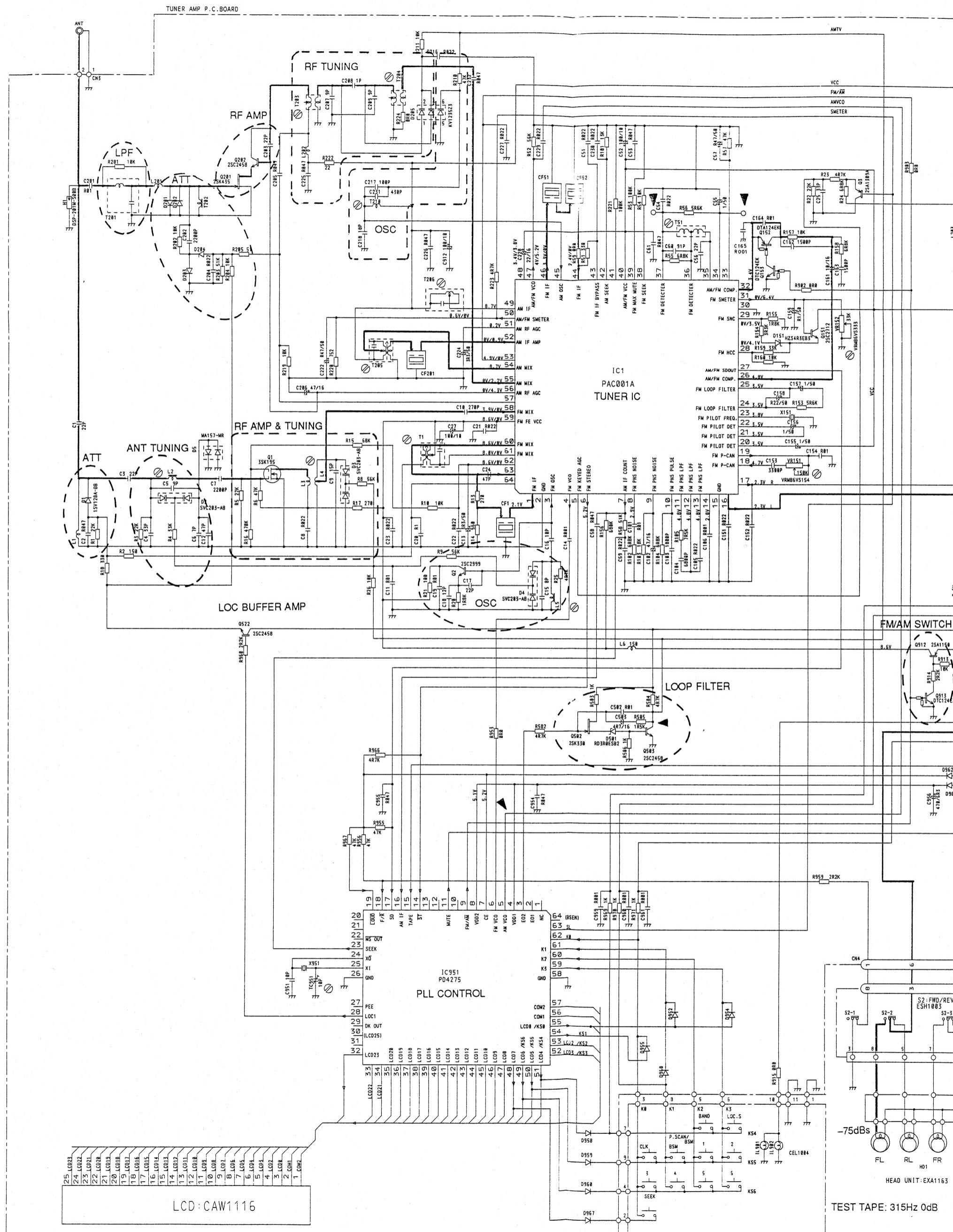
IC's marked by \* are MOS type.  
Be careful in handling them because they are very  
lible to be damaged by electrostatic induction.

43	LC012	8	64 (BSEN)
44	LC011	7	63
45	LC010	6	62
46	LC09	5	K8
47	LC08	4	K1
48	LC07/KS7	3	K2
49	LC06/KS6	2	K3
50	LC05/KS5	1	GND
51	LC04/KS4		
	LCD8/KS8		
	LCD7/KS7		57
	LCD6/KS6		56
	LCD5/KS5		55
	LCD4/KS4		54
	LCD3/KS3		53
	LCD2/KS2		52
	LCD1/KS1		

## COMMON



## 6. SCHEMATIC CIRCUIT DIAGRAM



**NOTE:**

- Symbol indicates a resistor.  
No differentiation is made between chip resistors and discrete resistors.

-II- Symbol indicates a capacitor.  
No differentiation is made between discrete capacitors.

No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as:

2. 2→2R2

0.022→R022

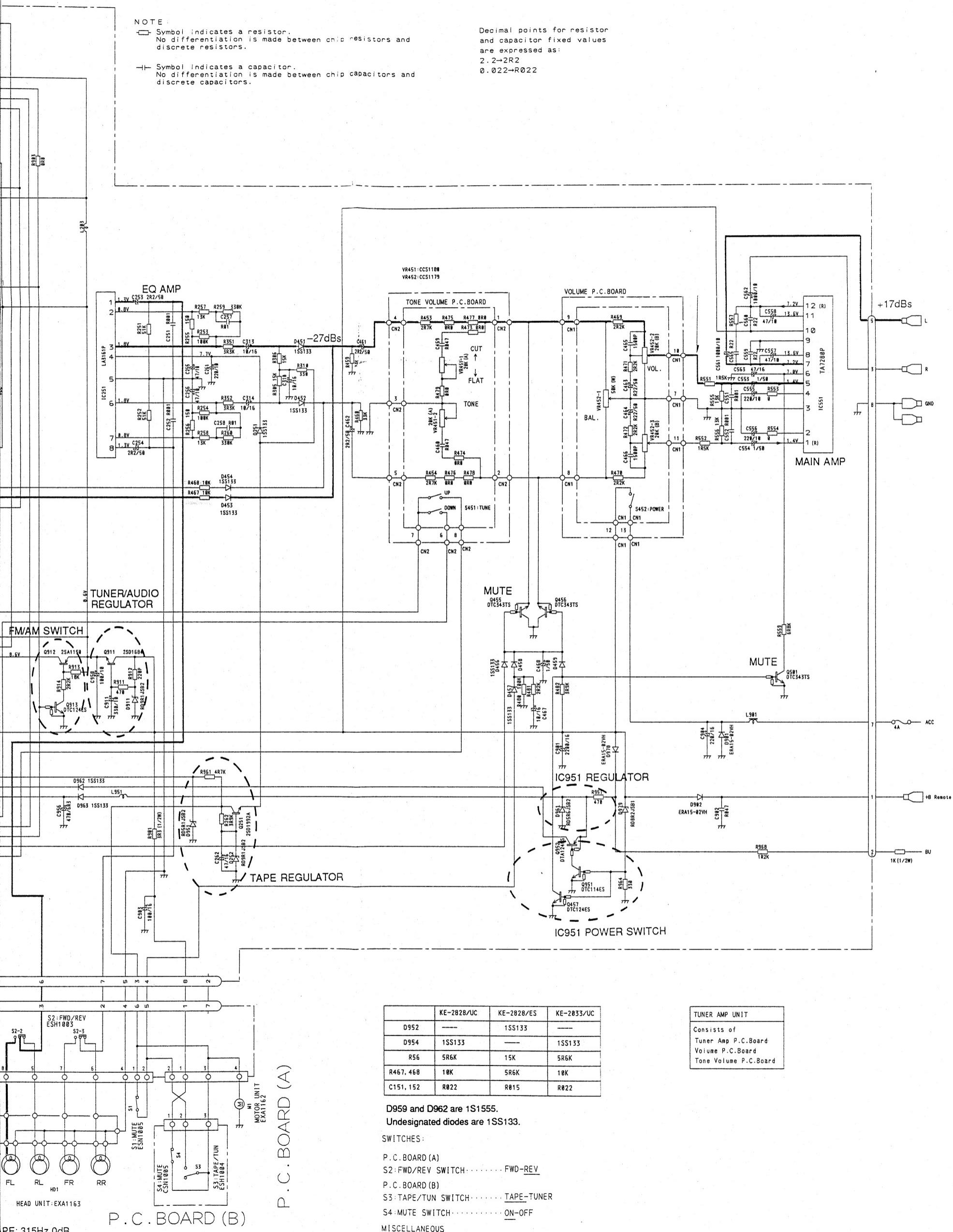
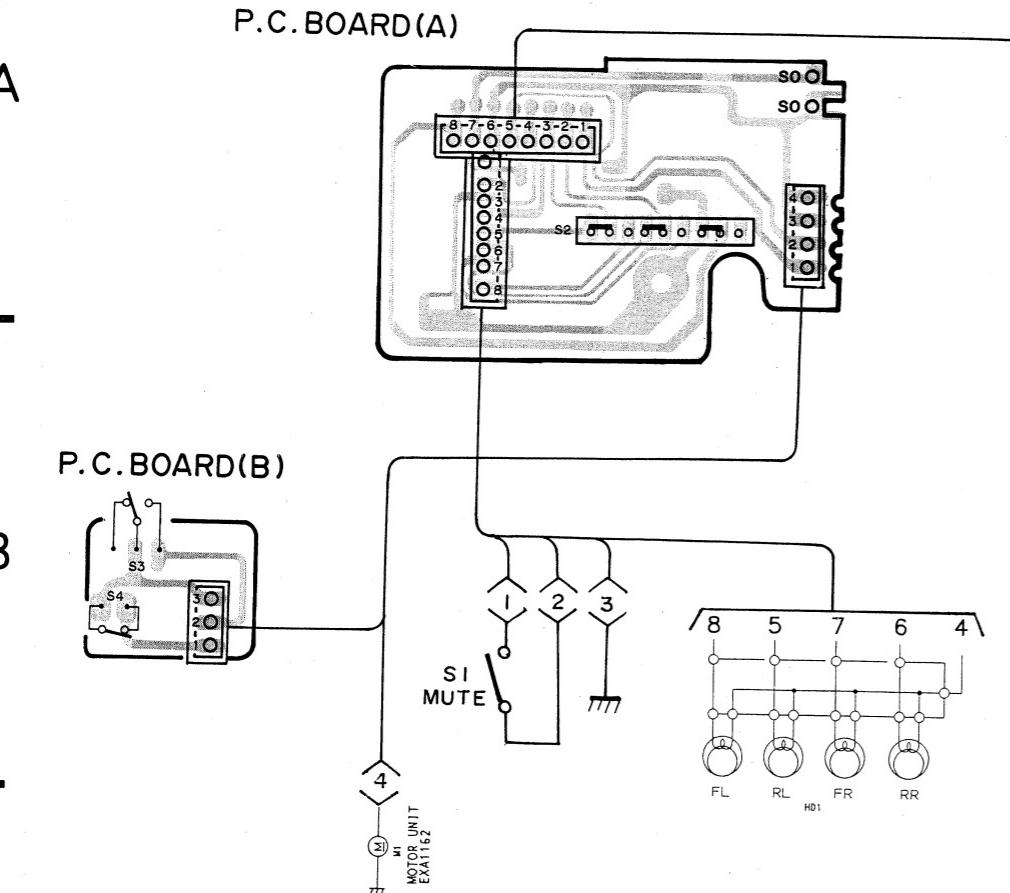
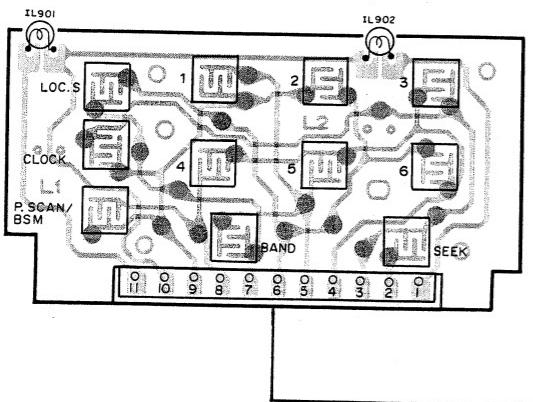


Fig. 7

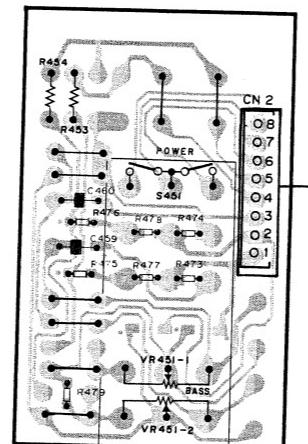
## 7. CONNECTION DIAGRAM



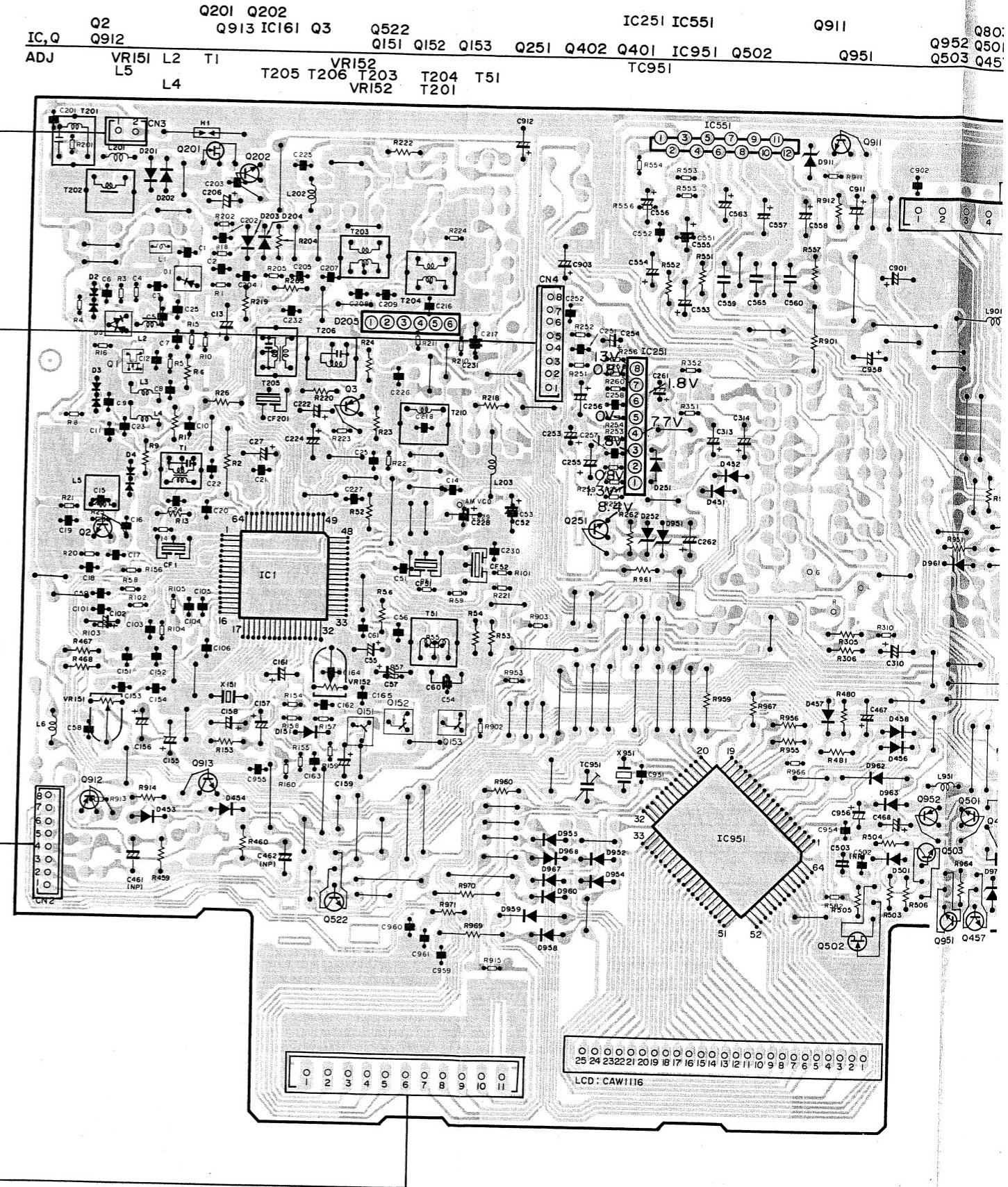
**KEY BOARD UNIT**



**TONE VOLUME P.C.BOARD**



**TUNER ANP P.C.BOARD**



4

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9

## TUNER ANP P.C.BOARD

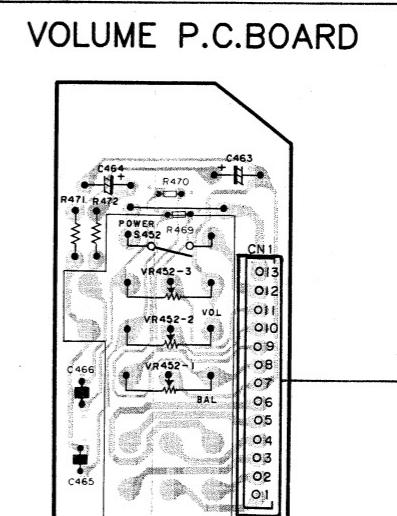
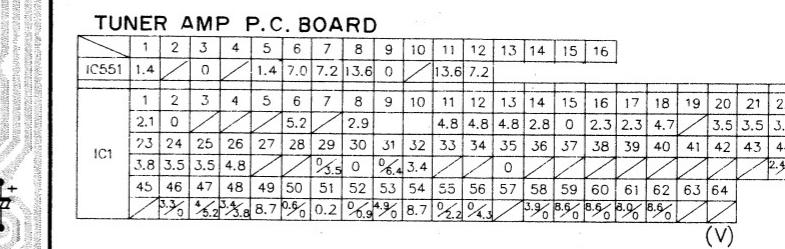
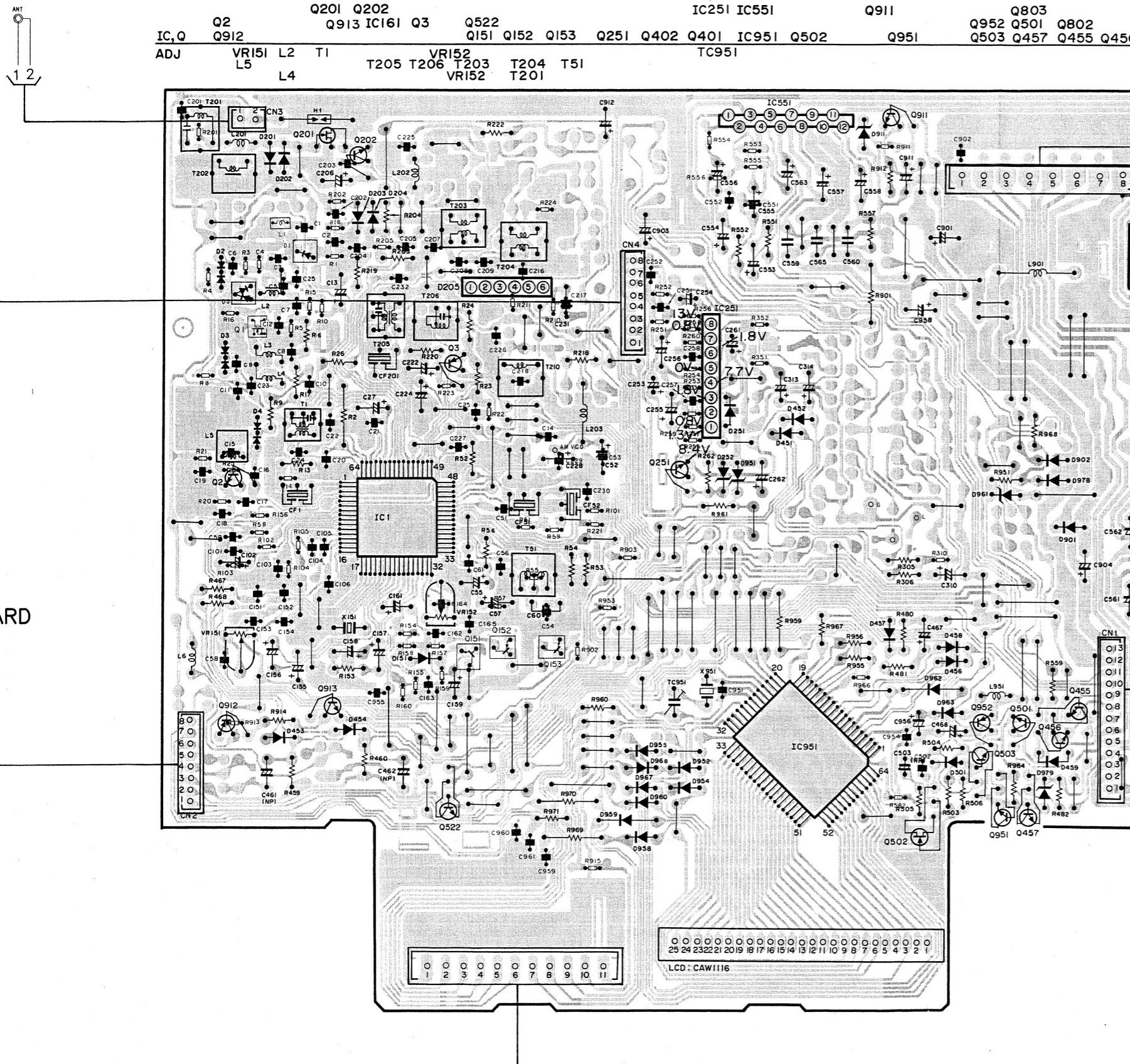


Fig. 8

4

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8

6

## **8. CHASSIS EXPLODED VIEW**

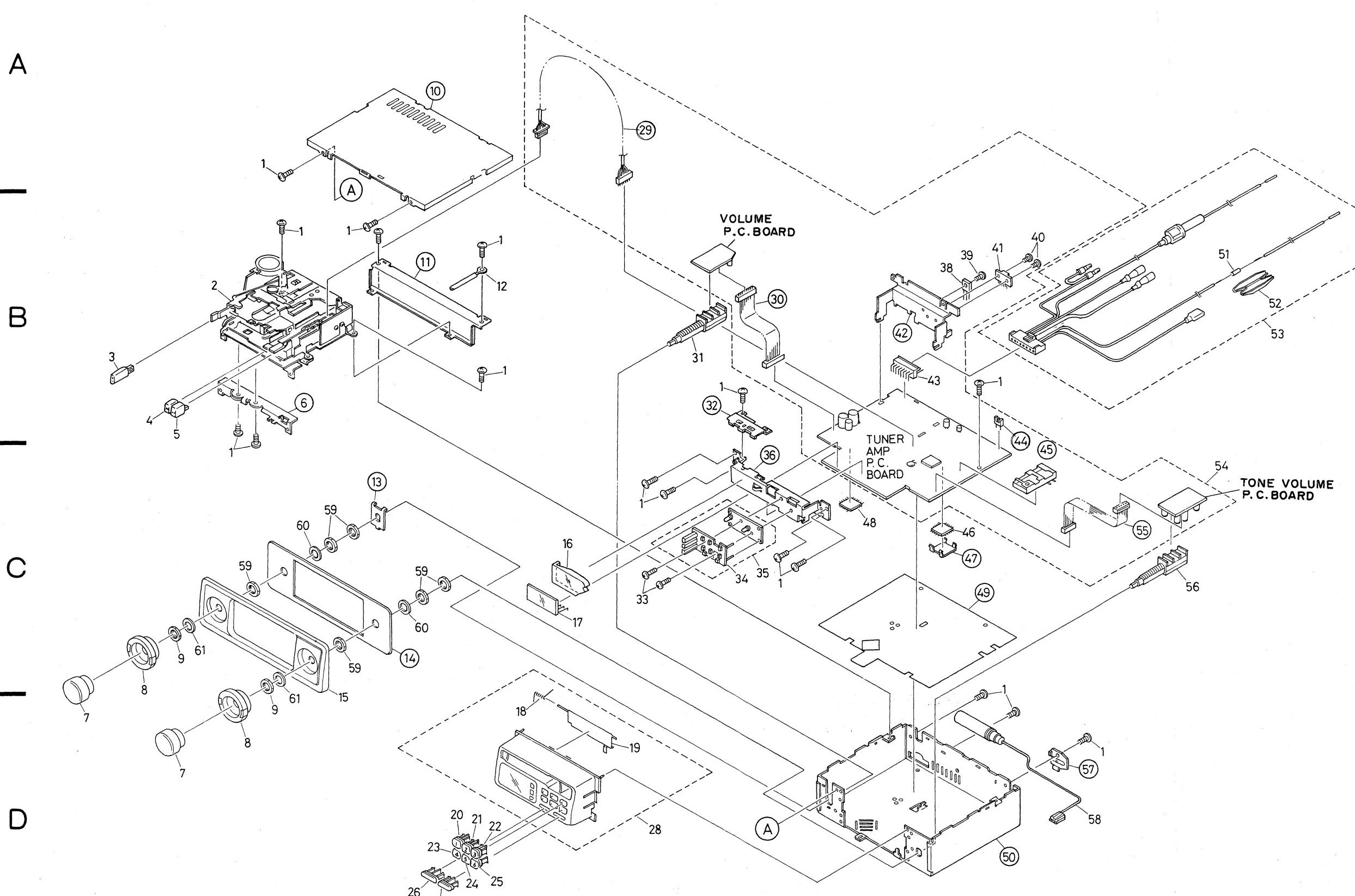


Fig. 9

**NOTE:**

- *Parts* ✓
- *Parts* ✓  
longer

- Parts

Mark N

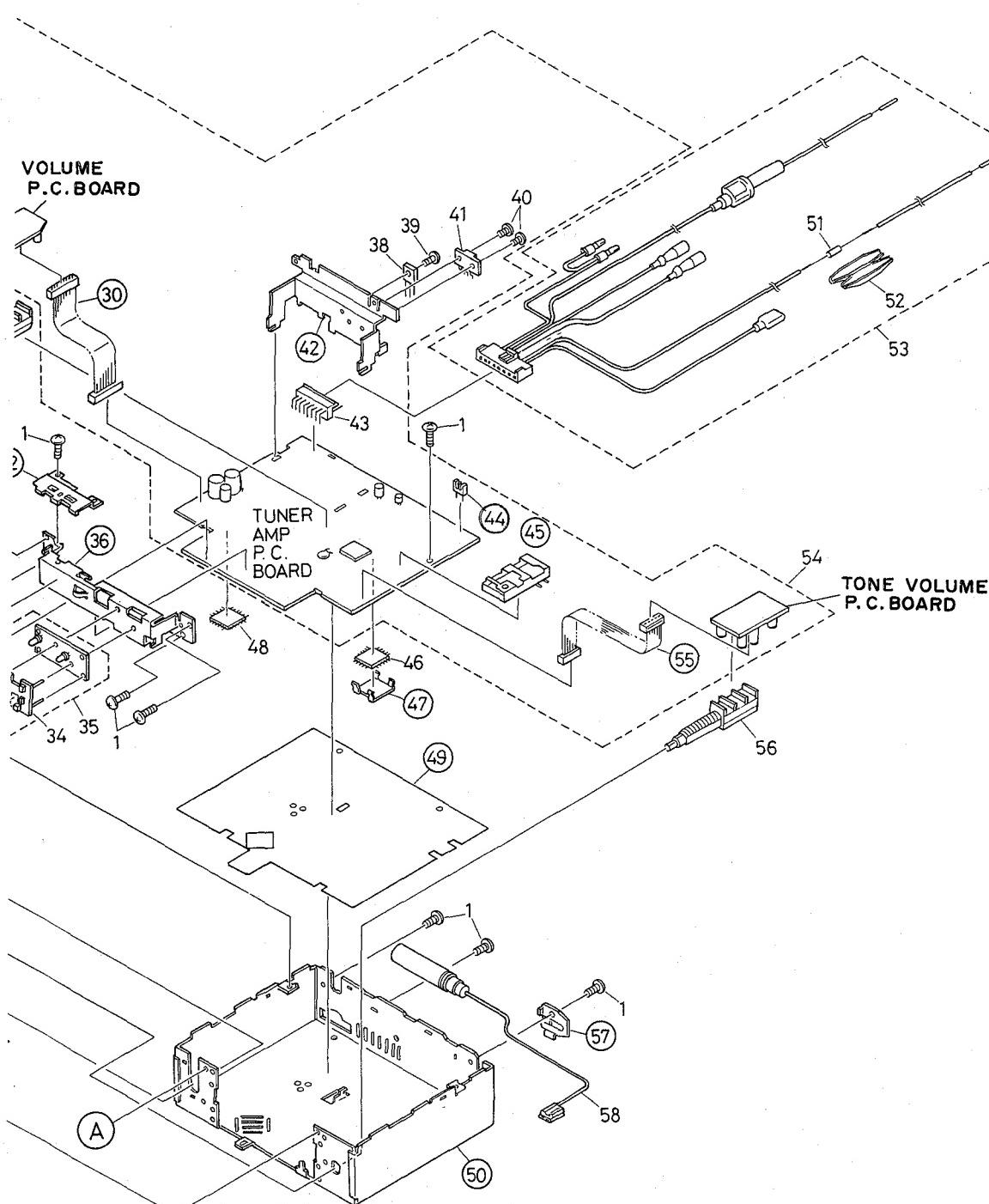


Fig. 9

**NOTE:**

- Parts whose part numbers are omitted are subject to being not supplied.
- Parts marked by "◎" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

**A****• Parts List**

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Screw	BMZ26P050FMC	36	Bracket	
◎ 2	Cassette Mechanism Assy	EXK1710	37	.....	
3	Button(EJ)	CAC2669	38	Transistor	2SD1684
4	Button(REW)	CAC2667	39	Screw	BMZ30P080FMC
5	Button(FF)	CAC2666	40	Screw	BMZ30P050FMC
6	Bracket		41	IC	TA7280P
7	Knob	CAA1239	42	Bracket	
8	Knob	CAA1238	43	Plug	CKS-465
9	Nut	CBN1001	44	Plug	
10	Case		45	Case	
11	Bracket		46	IC	PAC001A
12	Clamper	CEF-007	47	Shield	
13	Holder		48	IC	PD4275
14	Plate		49	Insulator	
15	Panel	CNS2209	50	Chassis	
16	Lens	CNV2602	51	Resistor	RS1/2P102JL
17	LCD	CAW1116	52	Cap	CNS1472
18	Spring	CBH1396	53	Cord Assy	CDE3139
19	Door	CAT1361	◎ 54	Tuner Amp Unit (KE-2033, 2828/UC)	CWM2521
20	Button(1)	CAC2658		Tuner Amp Unit (KE-2033/XSG, (KE-2828/XSG)	CWM2566
21	Button(2)	CAC2659		Tuner Amp Unit (KE-2828/ES)	CWM2522
22	Button(3)	CAC2660			
23	Button(4)	CAC2661			
24	Button(5)	CAC2662			
25	Button(6)	CAC2663	55	Connector	
26	Button(BAND)	CAC2904	56	Volume	CCS1180
27	Button(SEEK)	CAC2905	57	Holder	
28	Grille Unit(KE-2033)	CXA3876	58	Antenna Cable	CDH1115
	Grille Unit(KE-2828)	CXA3875	59	Nut	CBN-028
29	Connector		60	Washer	CND-646
30	Connector	CCS1179	61	Spacer	CNC1528
31	Volume				
32	Bracket				
33	Screw	BMZ20P040FMC			
34	Rubber	CNV2601			
◎ 35	Key Board Unit (UC, ES)	CWS1193			
	Key Board Unit (XSG/UC)	CWS1195			

1

2

3

• Cassette Mechanism Assy

## 9. CASSETTE MECHANISM ASSY EXPLODED VIEW

### • Parts List

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Reel Unit	EXA1167	46	Switch	ESH1004
2	Gear Unit	EXA1159	47	Switch	CSN1005
3	Washer	CBF1037	48	Screw	CBA1025
4	Gear	ENV1230	49	Gear	ENV1229
5	Gear	ENV1203	50	Washer	CBF1038
6	Gear	ENV1204	51	Belt	ENT1020
7	Gear	ENV1212	52	Gear	ENV1209
8	Gear	ENV1211	53	Arm Unit	EXA1155
9	Sub Chassis Unit		54	Washer	YE30FUC
10	Arm	ENV1210	55	Spring	EBH1310
11	Screw	BMZ20P025FMC	56	Flywheel Unit	EXA1161
12	Spring	EBH1304	57	Belt	ENT1018
13	Screw	JFZ20P040FNI	58	Arm	ENV1206
14	Collar	ELA1220	59	Spring	EBH1317
15	Shaft		60	Gear	ENV1205
16	Lever	ENC1202	61	Chassis Unit	
17	Washer	EBF1015	62	Screw	JFZ20P025FNI
18	Gear	ENV1268	63	....	
19	Spring	EBH1313	64	Pulley	ENV1207
20	Spring	EBH1314	65	....	
21	Lever	ENC1208	66	....	
22	Spring	EBH1307	67	Plug	
23	Tube		68	P.C. Board	
24	Spring	EBH1306	69	Switch	ESH1003
25	....		70	Washer	WH23FMC
26	Lever	ENC1209	71	Screw	BSZ23P040FMC
27	Spring	EBH1316	72	Screw	CBA1015
28	Arm	ENC1222	73	Head Unit	EXA1163
29	Spring	EBH1308	74	P.C. Board	ENP1042
30	Washer	YE15FUC	75	Switch	ESN1005
31	Arm	ENC1221	76	Washer	YE20FUC
32	Spring	EBH1305	77	Pinch Roller Unit	EXA1154
33	Frame	ENC1204	78	....	
34	Arm	ENC1215	79	....	
35	Shaft	ELA1251	80	Arm	ENC1213
36	Holder	ENC1205	81	Screw	CBA1038
37	Spring	EBH1344	82	Arm	ENV1227
38	Lever	ENV1222	83	Spring	EBH1312
39	Head Base Unit	EXA1152	84	Arm	ENC1212
40	Tube		85	Spring	EBH1309
41	Spring	EBH1315	86	Lever	ENC1206
42	Motor Unit	EXA1162	87	Spring	EBH1309
43	Screw	PMS26P025FUC	88	Lever	ENC1207
44	Screw	CBA1054	89	....	
45	P.C. Board		90	Pinch Roller Unit	EXA1153

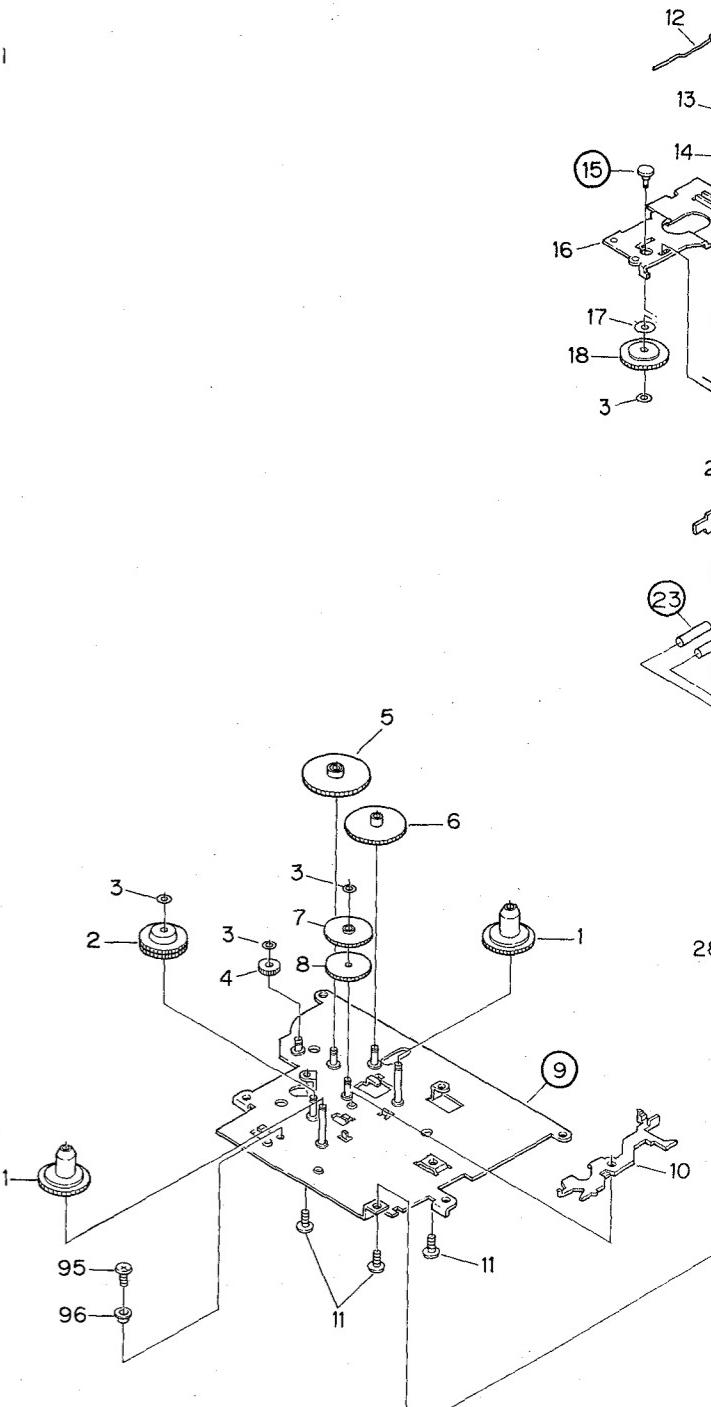
Mark No.	Description	Part No.
91	....	
92	Arm	ENC1220
93	Spring	EBH1311
94	Collar	ELA1229
95	Screw	JGZ17P035FNI
96	Collar	ELA1252

B

C

D

1



23

1

2

3

1

2

3

4

5

6

## • Cassette Mechanism Assy

Mark No. Description

Part No.

**A**

91 .....	
92 Arm	ENC1220
93 Spring	EBH1311
94 Collar	ELA1229
95 Screw	JGZ17P035FNI
96 Collar	ELA1252

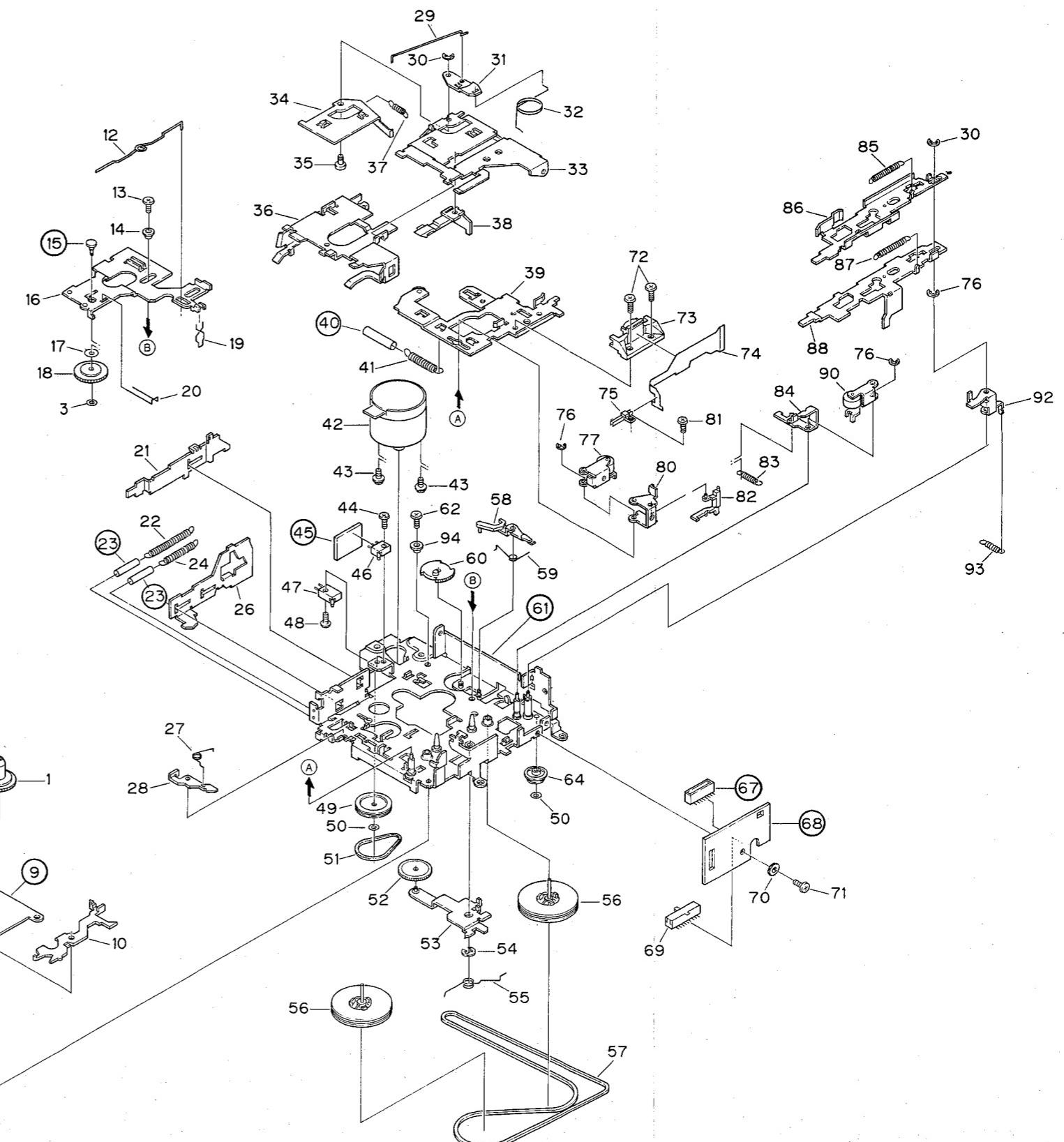


Fig. 10

## 10. PACKING METHOD

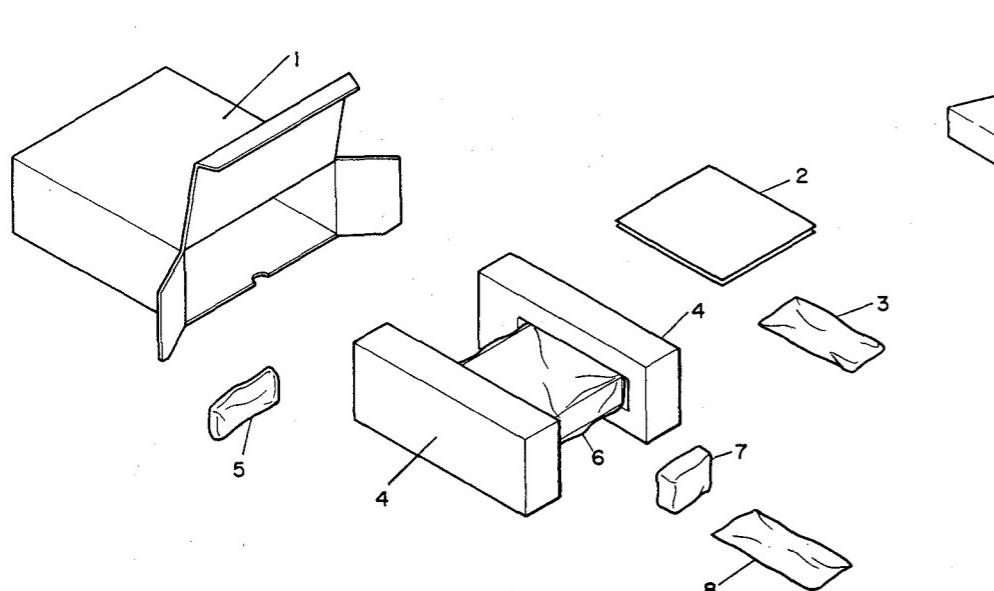


Fig. 11

NSP: Non spare part

No.	Description	KE-2033/UC	KE-2828/UC	KE-2828/ES	KE-2033/XSG	KE-2828/XSG
	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
1	Carton	CHG1900	CHG1899	CHG1901	CHG1917	CHG1916
2-1	Owner's Manual	CRD1423	CRD1422	CRD1424	CRD1443	CRD1442
2-2	Card	NSP	NSP	---	NSP	NSP
3	Accessory Assy	CEA1617	CEA1617	CEA1617	CEA1612	CEA1612
4	Styrofoam (X 2)	CHP1376	CHP1376	CHP1376	CHP1383	CHP1383
9	Contain Box	CHL1900	CHL1899	NSP	CHL1917	CHL1916

\*Owner's Manual

Part No.	Model	Language
CRD1423	KE-2033/UC	English, French, Spanish
CRD1422	KE-2828/UC	English, French
CRD1424	KE-2828/ES	English, French, Spanish, Arabic
CRD1442	KE-2828/XSG	English, French
CRD1443	KE-2033/XSG	English, French, Spanish

## ● Parts List (KE-2033/UC)

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Carton	CHG1900	3-4-8	Screw (X 2)	PMB50Y160FMC
2-1	Owner's Manual	CRD1423	3-4-9	Washer (X 1)	WS40FMC
2-2	Card		4	Styrofoam (X 2)	CHP1376
3	Accessory Assy	CEA1617	5	Cord Assy	CDE3139
3-1	Cord	CDE1289	6	Polyethylene Bag	CEG-215
3-2	Strap	CNF-111	7	Knob Assy	CXA3859
3-3	Cover	CNS-722	7-1	Knob (X 2)	CAA1238
3-4	Screw Assy		7-2	Knob (X 2)	CAA1239
3-4-1	Screw for Strap (X 1)	CBA-028	8	Panel Assy	CXA4065
3-4-2	Nut (X 4)	CBN-028	8-1	Plate	
3-4-3	Nut (X 2)	CBN1001	8-2	Panel	CNS2209
3-4-4	Spacer (X 2)	CNC1528	9	Contain Box	CHL1900
3-4-5	Spacer (X 10)	CND-646			
3-4-6	Nut (X 1)	NF40FMC			
3-4-7	Nut (X 2)	NF50FMC			

## 11. ELECTRICAL PARTS LIST

### NOTE:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

### Chip Resistor

RS1/8S □□□J, RS1/10S □□□J

Chip Capacitor (except for CQS....)  
CKS...., CCS...., CSZS....

### Unit Number :

Unit Name : Tuner Amp Unit(KE-2033/UC, XSG/UC, 2828/UC, XSG/UC)

Tuner Amp Unit
Consists of
• Tuner Amp P.C. Board • Volume P.C. Board • Tone Volume P.C. Board

### MISCELLANEOUS

Mark =====	Circuit Symbol & No.	==== Part Name	Part No.	Mark =====	Circuit Symbol & No.	==== Part Name	Part No.
IC 1		PAC001A	Q 201				2SK435
IC 251		LA3161P	Q 202 503 522				2SC2458
IC 551		TA7280P	Q 251				2SD1992A
IC 951		PD4275	Q 455 456 501				DTC343TS
Q 1		3SK195	Q 457 913				DTC124ES
Q 2							R 9
Q 3							R 10
Q 151		ZSC2999	Q 502				R 13
Q 152		2SA1309A	Q 911				R 14
Q 153		Chip Transistor	Q 912				R 15
		ZSC2712	Q 951				R 16
		DTA124EK	Q 952				R 18
		DTA124EK	Q 952				R 20
							R 21
							R 22

NSP: Non spare part					
	KE-2033/UC	KE-2828/UC	KE-2828/ES	KE-2033/XSG	KE-2828/XSG
No. Description	Part No.	Part No.	Part No.	Part No.	Part No.
1 Carton	CHG1900	CHG1899	CHG1901	CHG1917	CHG1916
2-1 Owner's Manual	CRD1423	CRD1422	CRD1424	CRD1443	CRD1442
2-2 Card	NSP	NSP	---	NSP	NSP
3 Accessory Assy	CEA1617	CEA1617	CEA1617	CEA1612	CEA1612
4 Styrofoam (x 2)	CHP1376	CHP1376	CHP1376	CHP1383	CHP1383
9 Contain Box	CHL1900	CHL1899	NSP	CHL1917	CHL1916

\*Owner's Manual

Part No.	Model	Language
CRD1423	KE-2033/UC	English, French, Spanish
CRD1422	KE-2828/UC	English, French
CRD1424	KE-2828/ES	English, French, Spanish, Arabic
CRD1442	KE-2828/XSG	English, French
CRD1443	KE-2033/XSG	English, French, Spanish

## 11. ELECTRICAL PARTS LIST

### NOTE:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

#### Chip Resistor

RS1/8S□□□J, RS1/10S□□□J

#### Chip Capacitor (except for CQS....)

CKS....., CCS....., CSZS.....

#### Unit Number :

Unit Name : Tuner Amp Unit(KE-2033/UC, /XSG/UC, 2828/UC, XSG/UC)

Tuner Amp Unit
Consists of
• Tuner Amp P.C. Board
• Volume P.C. Board
• Tone Volume P.C. Board

#### MISCELLANEOUS

Mark ===== Circuit Symbol & No. ===== Part Name	Part No.	Mark ===== Circuit Symbol & No. ===== Part Name	Part No.
IC 1	PAC001A	Q 201	2SK435
IC 251	LA3161P	Q 202 503 522	2SC2458
IC 551	TA7280P	Q 251	2SD1992A
IC 951	PD4275	Q 455 456 501	DTC343TS
Q 1	3SK195	Q 457 913	DTC124ES
Q 2	2SC2999	Q 502	2SK330
Q 3	2SA1309A	Q 911	2SD1684
Q 151	Chip Transistor	2SC2712	2SA1150
Q 152	Chip Transistor	DTA124EK	DTC114ES
Q 153	Chip Transistor	DTA124EK	DTA124ES

Mark ===== Circuit Symbol & No. ===== Part Name	Part No.	Mark ===== Circuit Symbol & No. ===== Part Name	Part No.
D 1 3 4	Chip Diode	1SV128A	R 23
D 2 5	Variable Capacitance Diode	SVC203	R 24
D 151	Chip Diode	MA157-MR	R 25 223 966
D 201 202 203 204	251 451 452 453 454 456	HZS4R3E ISS1133	R 26 204 219 467 468
D 205	Variable Capacitance Diode	KV123573	R 54
D 252 911		R09R1JSB2	R 55 104 158
D 457 458 459 954	955 958 960 963	ISS1133	R 56 153
D 501		RD3R0ESB2	R 57 210
D 901 902 978		ERA15-02VH	R 58 251 252
D 951		R05R1JSB2	R 59 224 473 474 475 476 477 478 479
D 959 962		IS1655	RS1/10S0R0J
D 961		RDS6JSB2	RS1/10S133J
D 967 968		ISS1133	RS1/10S183J
D 979		RD8R2JS	RS1/10S752J
L 1	Inductor	CTF1065	R 154 351 352
L 2	Coil	CTC1022	R 156
L 3	Coil	CTC1020	R 203
L 4	Coil	CTC1056	R 205
L 5	OSC Coil	CTC1024	R 220
L 6	Inductor	LAU150K	R 221
L 201	Ferrri-Inductor	LAU4R7K	R 222
L 202	Ferrri-Inductor	LAU330K	R 253 254
L 203	Ferrri-Inductor	CTF-161	R 255 256
L 901		CTH1084	R 257 258
L 951	Ferrri-Inductor	LAU101K	R 259 260
T 1	Coil	CTC1064	R 262 482
T 51	Coil	CTC1060	R 305 306
T 201	Coil	CTB1056	R 453 454
T 202	Coil	CTB1008	R 459 460
T 203 204		CTB1058	R 469 470
T 205	Coil	CTE1041	R 471 472 481 914 960
T 206	Coil	CTE1042	R 503 506 971
T 210	Coil	CTB1061	R 504 961
TC 951	Trimmer	CCG-070	R 505 551 552
CF 1	Ceramic Filter	CTF-182	R 553 554 902 953
CF 51 52	Ceramic Filter	CTF1130	RS1/10S133J
CF 201	Filter	CTF1065	RD1/4PS010JL
H 1	DSB-201M	DSP-201M	RD1/4PS682JL
X 151		CSS1066	RS1/8S472J
X 951	Crystal Resonator	CSS1011	RD1/2PS3R3JL
VR 151		VRM86VS154	RS1/8S0R0J
VR 152		VRM86VS333	RS1/10S471J
VR 451		CCS1180	RD1/4PS221JL
VR 452		CCS1179	RD1/4PS471JL
LCD		CAW1116	R 959
			R 964
			R 968
			R 969 970
RESISTORS	CAPACITORS		
Mark ===== Circuit Symbol & No. ===== Part Name	Part No.	Mark ===== Circuit Symbol & No. ===== Part Name	Part No.
R 1 3 5		RS1/10S223J	
R 2		RD1/4PS151JL	
R 4 159		RS1/10S333J	
R 6 955 956 967		RD1/4PS473JL	
R 8		RS1/10S563J	
R 9 52		RD1/4PS563JL	
R 10 157 160 201 202 211 913		RS1/10S103J	
R 13 17		RD1/4PS271JL	
R 14		RS1/10S561J	
R 15		RS1/10S683J	
R 16		RS1/10S474J	
R 18 51 310		RS1/10S331J	
R 20 155		RS1/10S182J	
R 21		RS1/10S101J	
R 22		RS1/10S223J	
CCS0CH220J50			
CKSQYB473K25			
CCS0CH330J50			
CCS0TH090D50			
CCS0TH070D50			
CKSQYB222K50			
CKSQYB223K50			
CCS0TH150J50			
CCS0SL271J50			
CKSQYB103K50			

Mark =====	Circuit Symbol & No.	==== Part Name	Part No.
C 12 24		CCSOCH470J50	
C 13 224		CEA3R3M50LS	
C 14 959 960 961		CKSQYB102K50	
C 15		CCSOCH080D50	
C 16		CCSOCH100D50	
C 18		CCSOCH120J50	
C 20		CKSQYF104Z50	
C 21 23		CKSYB223K50	
C 27 52 912 958		CEA101M10LS	
C 55 155 156 157 468		CEA010M50LS2	
C 57 222		CEAR47M50LS2	
C 60		CCDLH910J50	
C 61		CKSYB473K50	
C 102 206 262		CEA470M16LS	
C 103		CKSQYB182K50	
C 104		CKSQYB682K50	
C 106 165		CKSQYB102K50	
C 151 152 230		CKSQYB223K50	
C 153		CKSQYB332K50	
C 158 463 464		CEAR22M50LS2	
C 159		CEA0R1M50LS2	
C 161 310 313 314 467		CEA100M16LS2	
C 162 163 465 466		CKSQYB152K50	
C 208		CCSOCH010C50	
C 217		CCSQRH101J50	
C 218		CCSQUJ180J50	
C 228		CEA220M16LS	
C 231		COPA431G2A	
C 251 252		CKSQYB102K50	
C 253 254		CEANL2R2M50LL	
C 255 256		CEA470M10LS	Miscellaneous Parts List
C 257 258		CKSQYB103K50	
C 261		CEA221M10L2	
C 459 460		CKSYB473K50	
C 461 462		CEA2R2M50LS2	
C 503	4.7 $\mu$ F/16V	CCH1005	S 1 Switch(MUTE)
C 551 552		CKSQYB102K50	M 1 Motor Unit
C 553 554		CEA010M50L2	HD 1 Head Unit
C 555 556		CEA221M10L2	
C 557 558		CEA470M10L2	
C 559 560 565		CQEA224J63	
C 561 562		CEA102M10L2	
C 563		CEA470M16L2	
C 901		CEA222M16L2	
C 903		CEA101M16L2	
C 904		CEA221M16L2	
C 911		CEA331M10L2	
C 951		CCSOCH100D50	
C 956		CEA471M6R3L2	

Tuner Amp Unit	KE-2033/UC	KE-2828/ES
Symbol & No.	Part No.	Part No.
D952	---	ISS133
D954	ISS133	---
R56	RD1/4PS562JL	RD1/4PS153JL
R310	RS1/10S331J	RS1/10S221J
R467, 468	RD1/4PS103JL	RD1/4PS562JL
C151, 152	CKSQYB223K50	CKSQYB153K50

Unit Number :  
Unit Name : Key Board Unit

## MISCELLANEOUS

Mark ===== Circuit Symbol & No. === Part Name Part No.

C 102 206 262	IL 901 902	Lamp 14V 40mA	CEL1004
---------------	------------	---------------	---------

Unit Number :  
Unit Name : P.C. Board(A)

Mark ===== Circuit Symbol & No. === Part Name Part No.

C 158 463 464	S 2	Switch(FWD/REV)	ESH1003
---------------	-----	-----------------	---------

Unit Number :  
Unit Name : P.C. Board(B)

Mark ===== Circuit Symbol & No. === Part Name Part No.

C 218	S 3	Switch(TAPE/TUN)	ESH1004
-------	-----	------------------	---------

Mark ===== Circuit Symbol & No. === Part Name Part No.

C 228	S 4	Switch(MUTE)	CSN1005
-------	-----	--------------	---------

Unit Number :  
Unit Name : P.C. Board(B)

CEA470M10LS

CKSQYB103K50

CEA221M10L2

CKSYB473K50

CEA2R2M50LS2

S 1 Switch(MUTE)

M 1 Motor Unit

HD 1 Head Unit

ESN1005

EXA1162

EXA1163

CEA220M16LS

COPA431G2A

CKSQYB152K50

CEANL2R2M50LL

S 3 Switch(TAPE/TUN)

S 4 Switch(MUTE)

ESH1004

CSN1005

CEA470M16L2

CEA222M16L2

CEA101M16L2

CEA221M16L2

CEA331M10L2

CCSOCH100D50

CEA471M6R3L2

# Service Manual

ORDER NO.  
**CRT1328**

CASSETTE MECHANISM ASSEMBLY

# CX-197

**NOTE**

- This service manual describes operation of the cassette mechanism incorporated in models listed in the table below.
- When performing repairs use this manual together with the specific manual for the model under repair.

Model	Service Manual	Cassette Mechanism Assembly
KE-1700B/IT		
KE-1700SDK/WG		
KE-1730B/EW		
KE-2700B/IT		
KE-2700SDK/WG	CRT1325	EXK1710
KE-2730B/EW		
KE-1700QR/UC		
KE-2303QR/UC	CRT1327	EXK1710
KE-2750QR/ES		
KE-2033/UC		
KE-2033/XSG/UC	CRT1331	EXK1710
KE-2828/XSG/UC		
KE-2828/ES, UC		
KE-3838/UC, ES		
KE-3838/XSG/UC	CRT1332	EXK1710
KE-3838/XML/UC		
KE-1700B/XML/IT	CRT1336	EXK1710
KE-1730B/XIB		
KE-1730B/XML/EW	CRT1337	EXK1710
KE-1730B/XSG/EW		
KE-2630B/XIB		
KE-2730B/XIB	CRT1340	EXK1710

Model	Service Manual	Cassette Mechanism Assembly
KE-1700QR/XML/UC	CRT1339	EXK1710
KE-3700SDK/WG		
KE-3730B/EW	CRT1326	EXK1720
KE-3700B/IT		
KE-2700QR/UC		
KE-3700QR/UC	CRT1327	EXK1720
KE-3750QR/ES		
KE-4848/ES, UC		
KE-4848/XML/UC	CRT1330	EXK1720
KE-4848/XSG/UC		
KE-250/US		
KE-3033/UC	CRT1332	EXK1720
KE-3033/XSG/UC		
KE-3730B/XIB	CRT1338	EXK1720
KE-450QR/US	CRT1327	EXK1750
KE-350/US	CRT1330	EXK1750

**PIONEER ELECTRONIC CORPORATION** 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan

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## 1. DISASSEMBLY

**Note:** Always use new washer and E washer at the time of reassembling.

### ● How to Remove the Belt and Motor

1. Remove screw A fixing the FR lever. (Fig.1)
2. Remove three screws B fixing the sub-chassis unit. Move the unit first in Direction A, then in B direction, and lift it upward for removal. (Fig.2)
3. The belt can now be removed. (Fig.3)
4. Remove two screws C. The motor can be removed. (Fig.3)

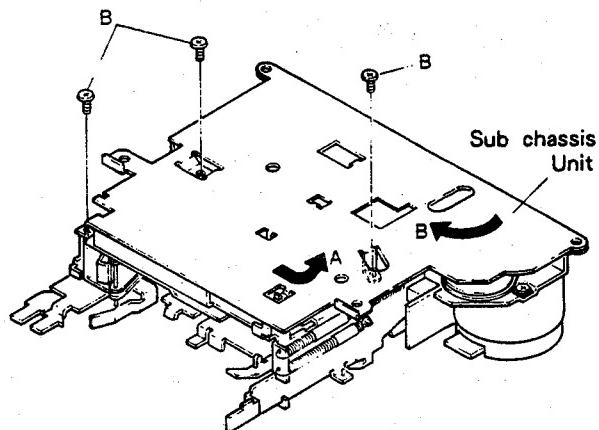


Fig. 2

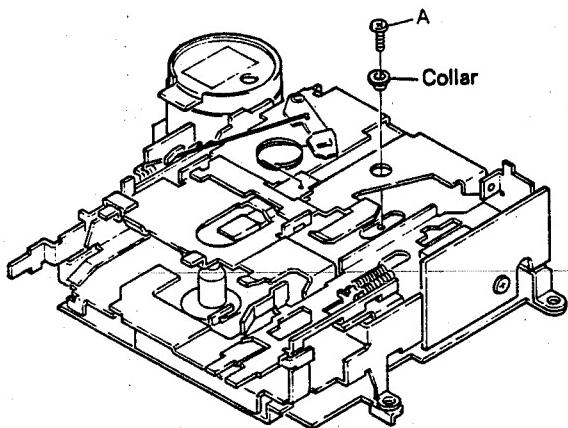


Fig. 1

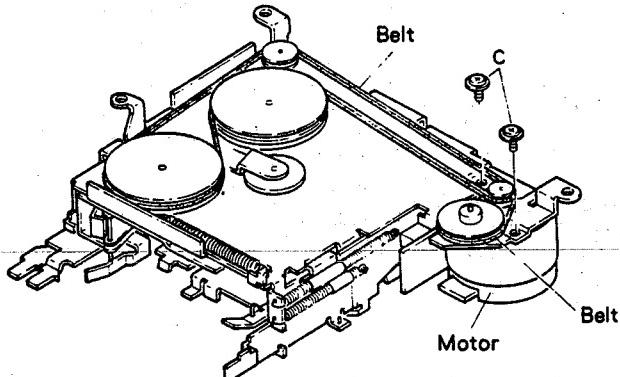


Fig. 3

● How to Remove the Pinch Roller Unit and Head

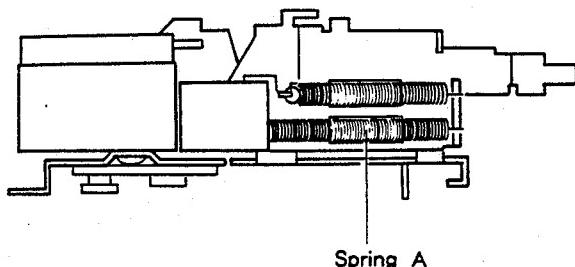


Fig. 4

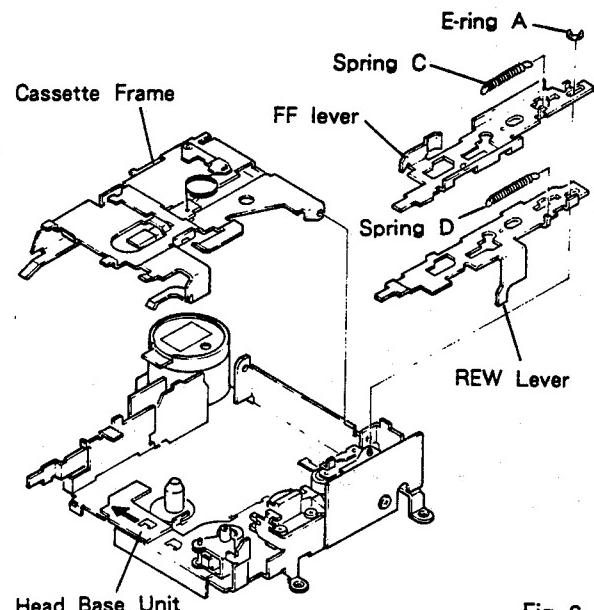


Fig. 6

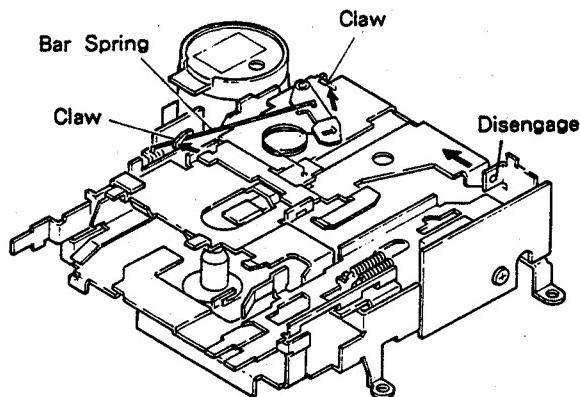


Fig. 5

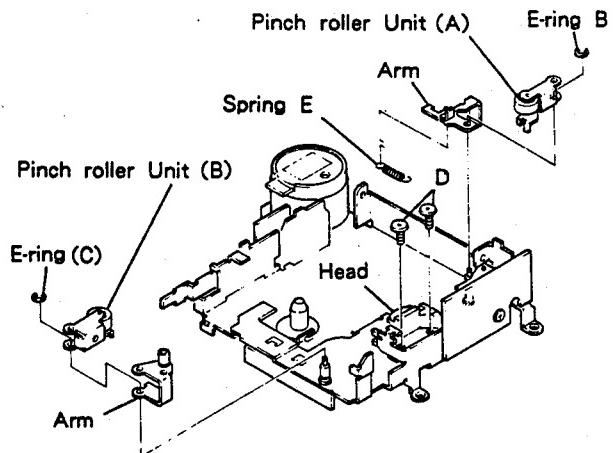


Fig. 7

1. Remove spring A. (Fig.4)
2. Extend claws (2 points). (Fig.5)
3. Remove bar Spring. (Fig.5)
4. Disengage projection by moving in a direction of arrow mark. (Fig.5)
5. The cassette frame is removed. (Fig.6)
6. Remove springs C and D. (Fig.6)
7. Remove E-ring A. (Fig.6)
8. Remove FF/REW levers. (Fig.6)
9. Move head base unit forward. (Fig.6)
10. Remove spring E. (Fig.7)
11. Remove E-ring B. The pinch roller unit (A) can be removed. (Fig.7)
12. Remove E-ring C. The pinch roller unit (B) can be removed. (Fig.7)
13. Remove two screws D. The head can be removed. (Fig.7)

## 2. ADJUSTMENT

### 2.1 CHECK POINTS OF CASSETTE MECHANISM

<p>Confirm the following items when replacing parts of the cassette mechanism.</p>	<p><b>Tape speed deviation:</b>  <math>3,000 \frac{+90}{-30} \text{ Hz}</math>  <math>(4.76 \text{ cm/s}) \frac{+3}{-1} \%</math></p> <p>Using an NCT-111, measure the speed at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5 — 6 seconds.</p>	<p><b>Wow and flutter:</b>      Less than 0.2% (WRMS)</p> <p>Using an NCT-111, measure the wow and flutter at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5 — 6 seconds.</p>
<p><b>Fast forward and rewinding time:</b>      100 — 120 seconds</p> <p>Using a C-60, set to fast forward and rewind, and measure the time with a stop watch.</p>	<p><b>Winding torque:</b>      35 — 65 g · cm</p> <p>Using a cassette type torque meter (100 g·cm), measure the minimum value while in the play mode. Measuring time shall be 2.5 — 6 seconds.</p>	<p><b>F.F. torque:</b>      70 — 120 g · cm</p> <p>Using a cassette type torque meter (120 g·cm), measure the value when the tape stops in the F.F. mode.</p>
<p><b>REW torque:</b>      70 — 120 g · cm</p> <p>Using a cassette type torque meter (120 g·cm), measure the value when the tape stops in the REW mode.</p>	<p><b>Back tension torque:</b>      2 — 6 g · cm</p> <p>After setting in the REW mode without loading a cassette tape for 5 minutes, measure the back tension torque in the play mode, using a cassette type torque meter.</p>	<p><b>Cassette loading force:</b>      Less than 0.7 kg</p> <p>Push the center of the cassette and measure the force with a tension meter (3 kg).</p>

## 2.2 AZIMUTH ADJUSTMENT

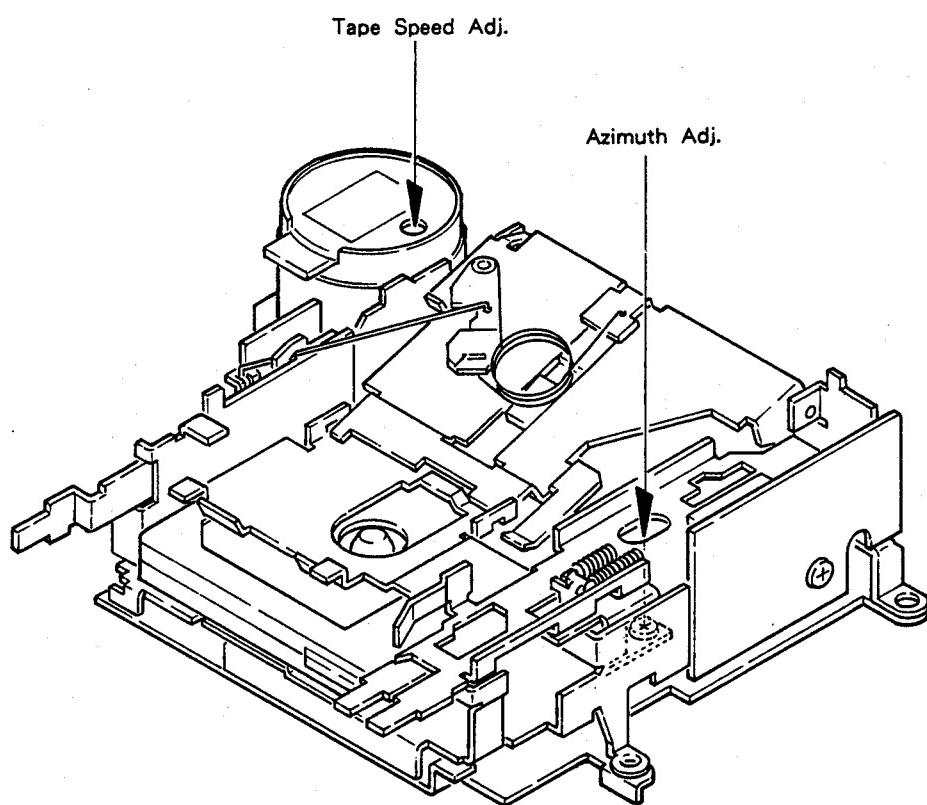


Fig. 8

### ● To Adjust (EXK1750)

1. Play "A" side of NCT-110 (10kHz, - 10dB). Adjust the screw for maximum output in forward and reverse directions.
2. Play "B" side in forward and reverse directions to confirm adjustment.

### 2.3 TAPE SPEED ADJUSTMENT

1. Reproduce NCT-111 (3kHz, - 10dB). Adjust the semifixed resistor so that frequency counter shows 3010Hz (+80Hz, - 40Hz).

### 3. MECHANISM DESCRIPTION

#### ● Loading operation

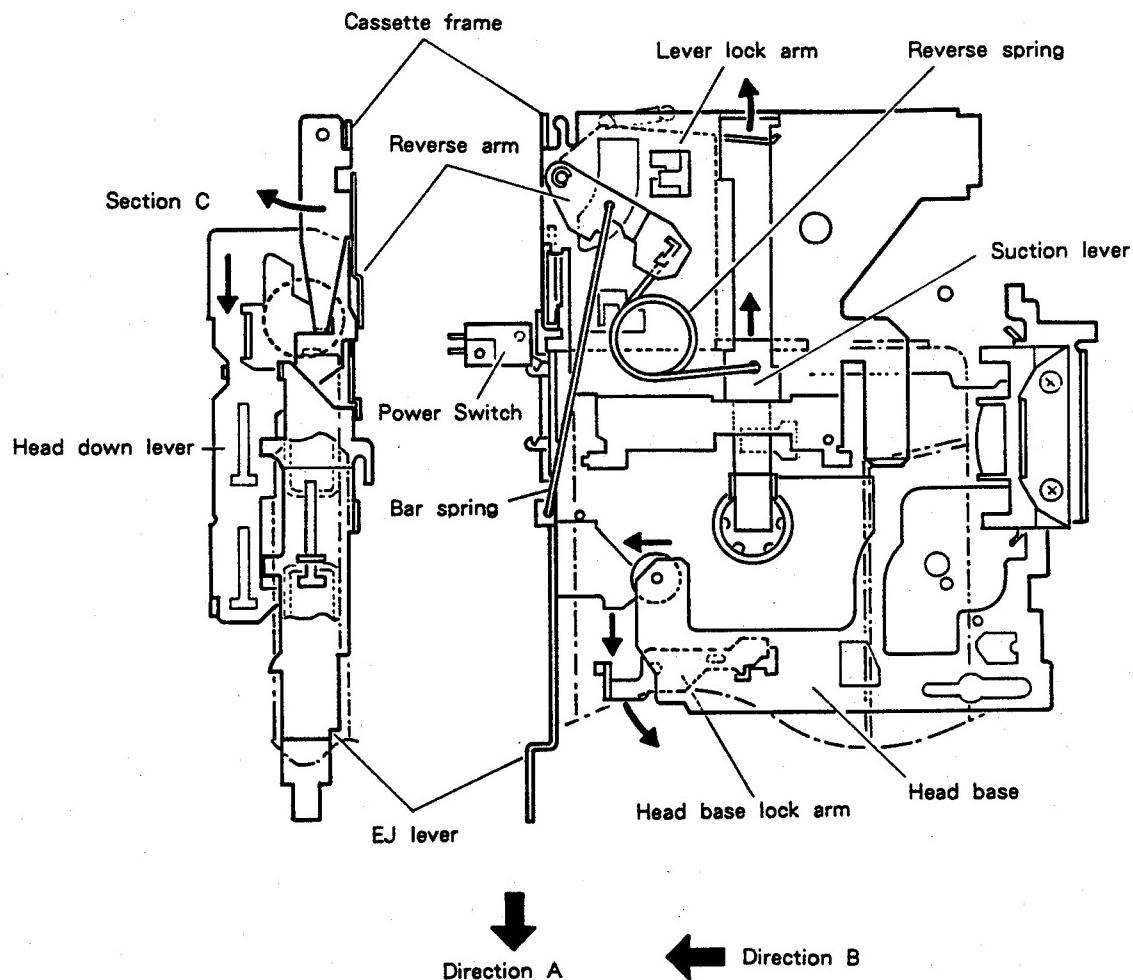


Fig. 9

1. A cassette tape, when inserted, pushes a suction lever. The reverse spring rotates to move past the reverse point. Then, the cassette is drawn by a force of a reverse spring (suction operation).
2. After suction, the lever lock arm is pressed to be unlocked.
3. The head down lever is unlocked and the lever moves in Direction A.
4. While moving, the EJ lever turns ON the power switch.
5. The cassette frame engaged to the section C of the head down lever turns. (Cassette drop operation)
6. At the stroke end, the head down lever turns the head base lock arm.
7. A Stopper of the head base lock arm is released, and the head base moves forward (Direction B).

● MS Operation (EXK1720, EXK1750)

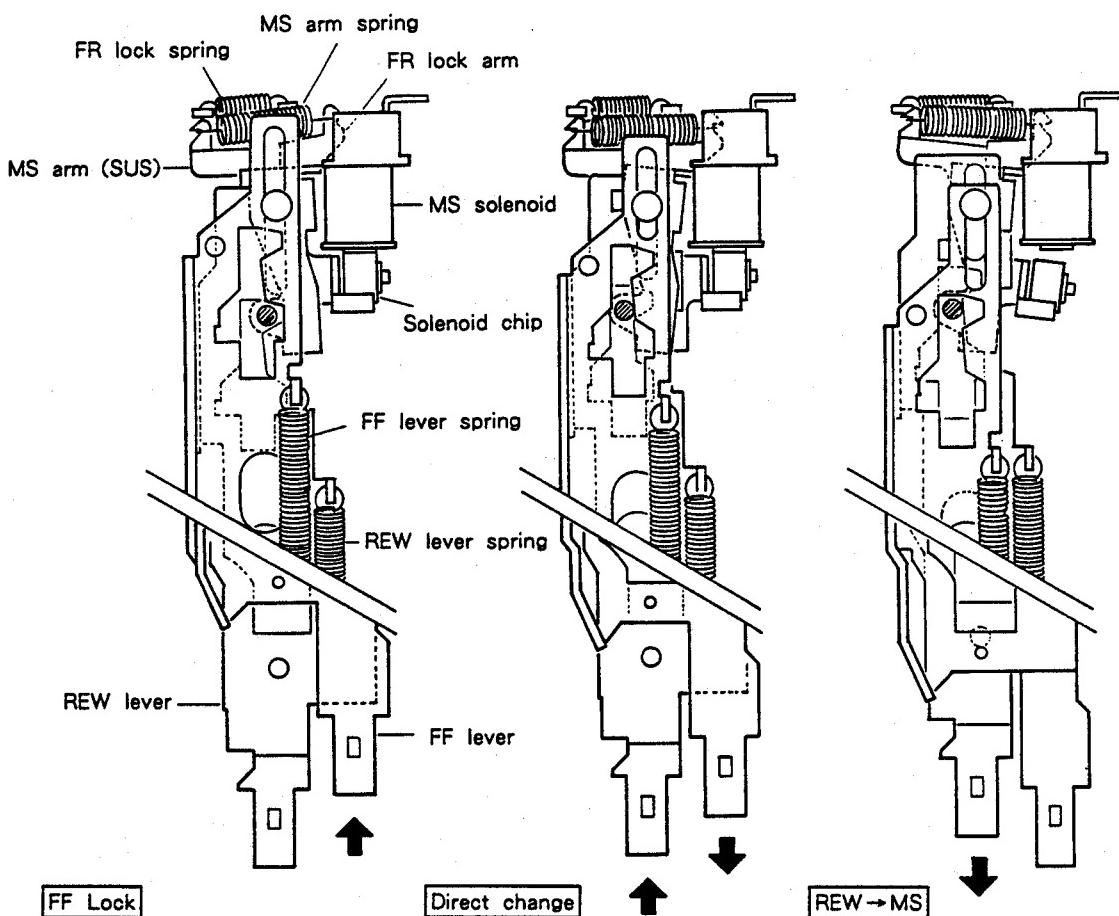


Fig. 10

Fig. 11

Fig. 12

1. The MS solenoid is normally energized to attract the solenoid chip during play and F/R operation. The solenoid chip applies counterclockwise force to the MS arm, thereby putting the FR lock arm into rotation via the MS arm spring. The MS lock shaft of FR lock arm unit catches a taper in a different hole of the FF (or REW) lever to lock the FF (or REW) lever.
2. In case of direct change, pressing the unlocked FF or REW lever causes the lever taper to turn the FR lock arm clockwise. This in turn presses the MS arm spring and FR lock spring to release the locked lever.
3. When the no recording section is caught and the power supply to the solenoid is cut off, the solenoid loses the attraction force and disables locking of the F/R lever. As a result, the F/R lever is unlocked. (This unlocking occurs because the force to retain the lever cannot be generated by the FR lock spring only.)

## ● Direction Changeover Operation

### (1) FWD play operation

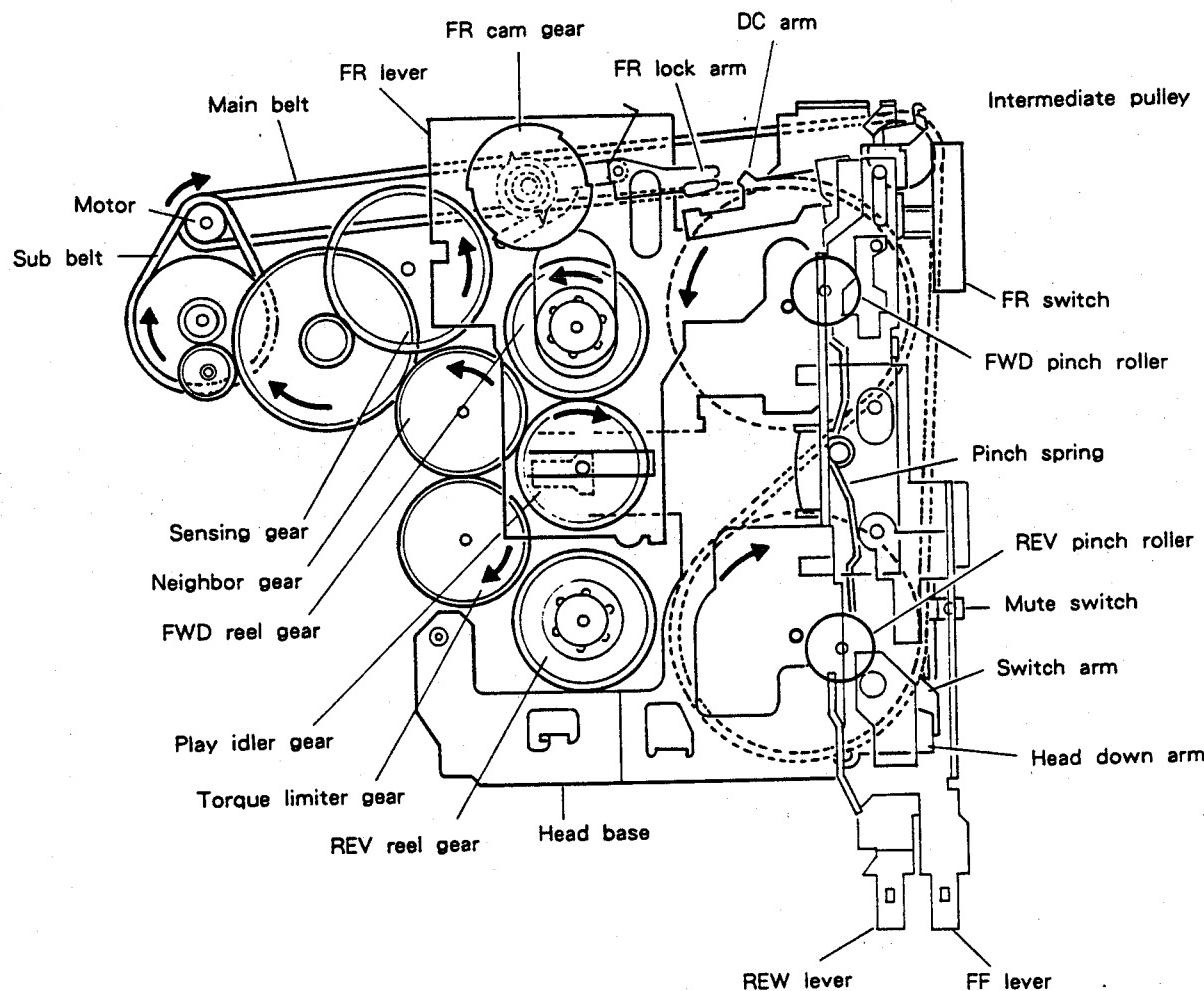


Fig. 13

When the FR lever is in the top position, the pinch spring is in the upper position to press the FWD pinch roller. The FR switch also moves upward and its reaction causes downward force on the FR lever. The spring attached to the FR lever applies upward force to the play idler gear from above to engage it with the neighbor gear and FWD reel gear.

The tape is driven in the FWD direction by a running motor and taken up by the REV reel gear via the torque limiter gear.

(2) Direction change operation

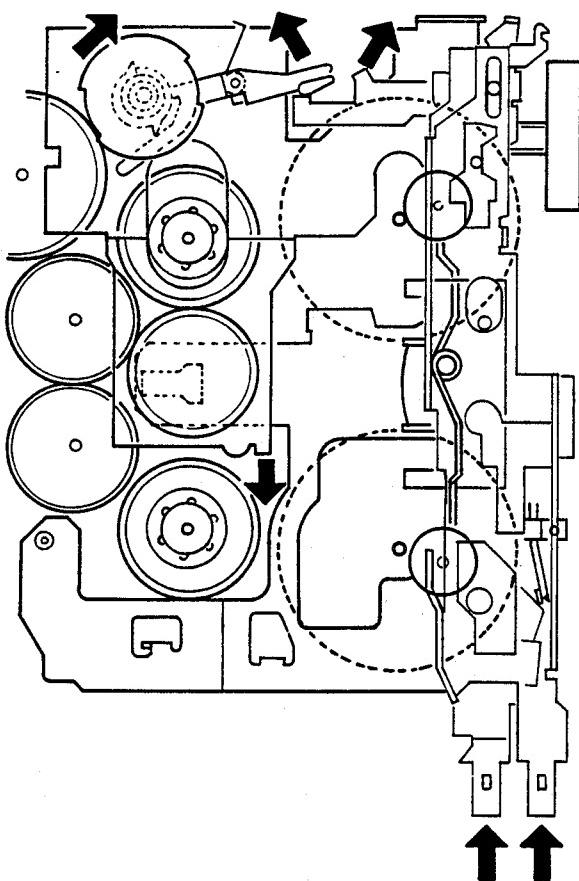


Fig. 14

(3) REV play operation

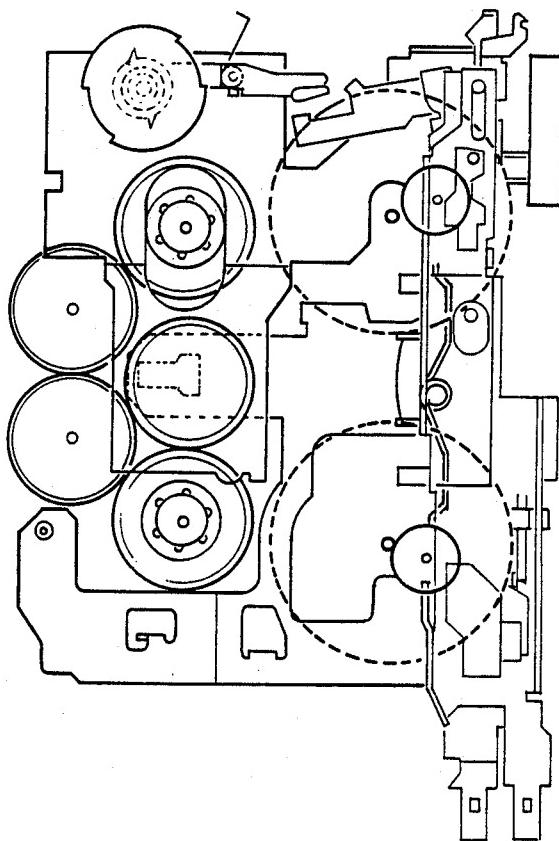


Fig. 15

The direction is changed by pressing FF and REV levers simultaneously. The DC arm turns along a cam groove of FF and REV levers to turn the FR lock arm. As the FR lever applies force from above downward, the FR cam gear turns and the notch meshes with the sensing gear. As a result, the FR lever moves downward.

When FF and REV levers are kept pressed, the lock arm contacts the outside of the FR cam gear to prevent changeover between FWD and REV. Pressing FF and REV levers also cause the mute switch to be turned ON. In other words, muting is valid while FF and REV levers are pressed. (Fig.14)

Moving the NR lever up and down causes changeover among the pinch roller, FR switch, and play idler gear. With FF and REV levers having been returned, the FR lock arm returns to the normal lock position and locks the gear when the FR gear completes an one-half turn. The mute arm also returns to turn OFF the mute switch. The reverse play state is thus obtained. (The same applies to changeover from REV to FWD.)

● FF/REV Operation

(1) FWD play operation

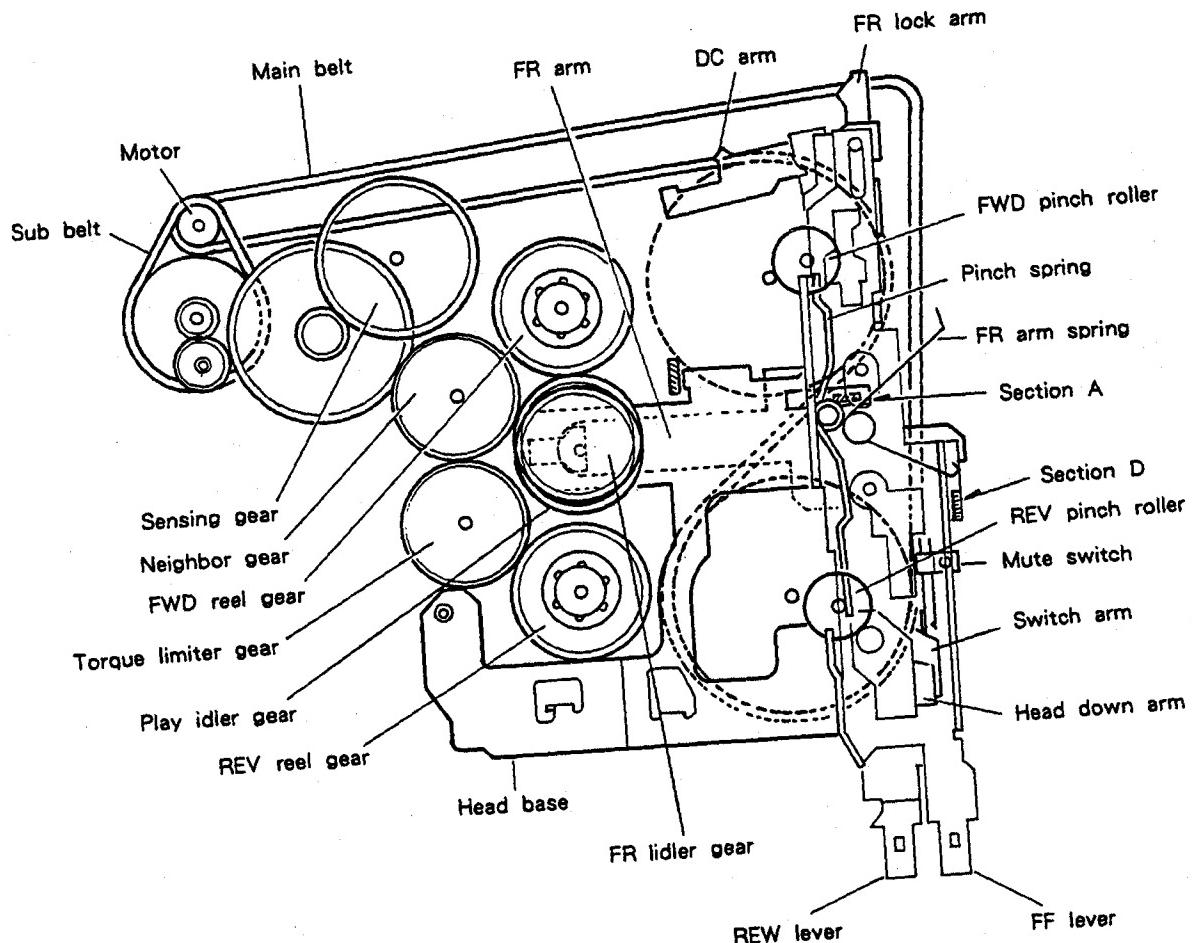


Fig. 16

In the FWD (REV) play state, the head base is fixed by a chassis stopper. The pinch spring presses the pinch roller into contact with a capstan to drive forward the tape. The REV reel gear takes up the tape via the torque limiter gear. In this case, the FR idler gear on the FR arm is centered by Section A of the head base and thus not rotating.

## (2) FF Operation

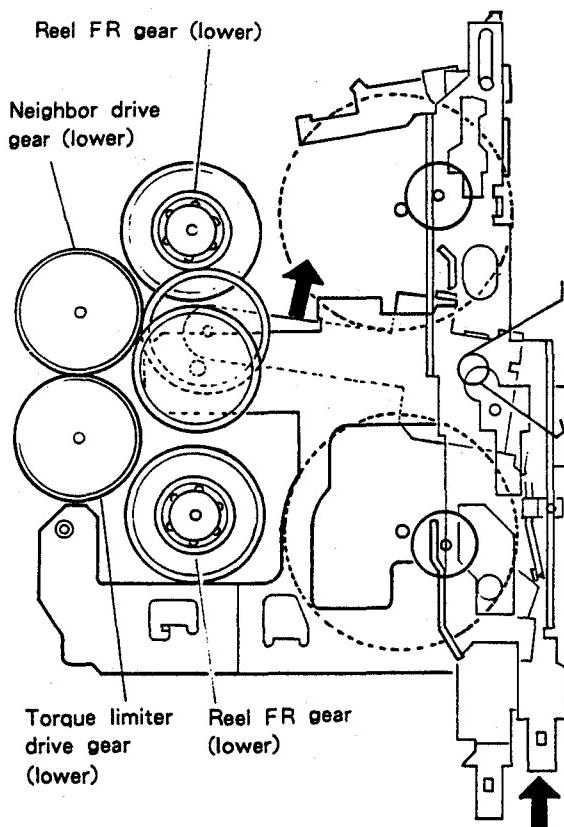


Fig. 17

## (3) REW operation

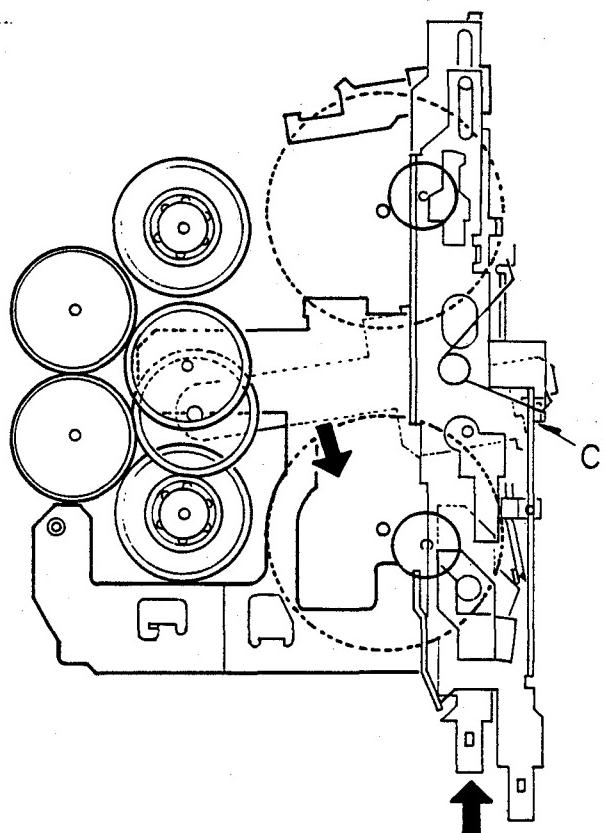


Fig. 18

FF operation is obtained by pressing and locking the FF lever. As the FF lever is pressed, the switch arm turns to turn ON the mute switch. The head base is moved backward along the FF lever cam groove.

As the head base moves backward to release the pinch roller from the capstan, the play idler gear is simultaneously disengaged from the reel gear. As the head base moves backward, the FR arm centered by Section A is put into rotation by the FR arm spring to engage with the FWD side FR gear.

The FF lever is locked by the FR lock arm and performs the FF operation. (Fig.17)

Similar to the case of FF operation, pressing the REW lever causes the mute switch to be turned ON.

Simultaneously with release of the pinch roller from the capstan, the play idler gear is disengaged from the reel gear.

Section D of the REW lever presses a movable side of the FR arm spring, thereby engaging the FR gear to the FR gear on the REV side.

The REW lever is locked by the lock arm, performing the REW operation. This operation is cancelled when Section C is turned by the lever return spring. (Fig.18)

● Sensing Operation

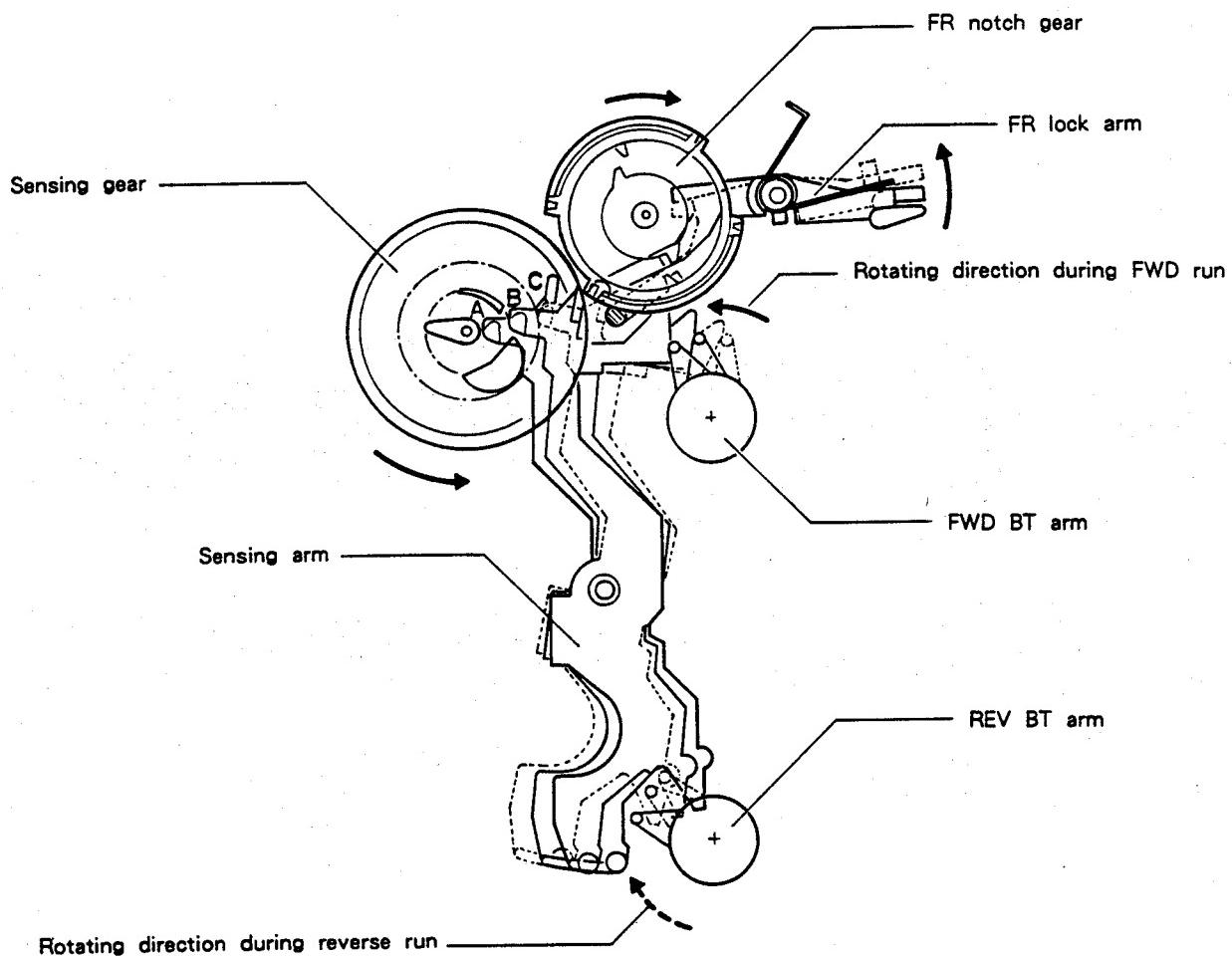


Fig. 19

1. During tape run: The sensing arm keeps oscillation between A and B under a force of the FWD BT arm (or REV BT arm).
2. At end of tape: The force of the BT arm is lost. The sensing arm stops at Position B, then pushed out to Position C by a crescent cam of the sensing gear.
3. Change of run direction: The FR lock arm turns counter-clockwise along with movement of the sensing arm. The FR notch gear is unlocked and begins to turn.

● ATSC Operation

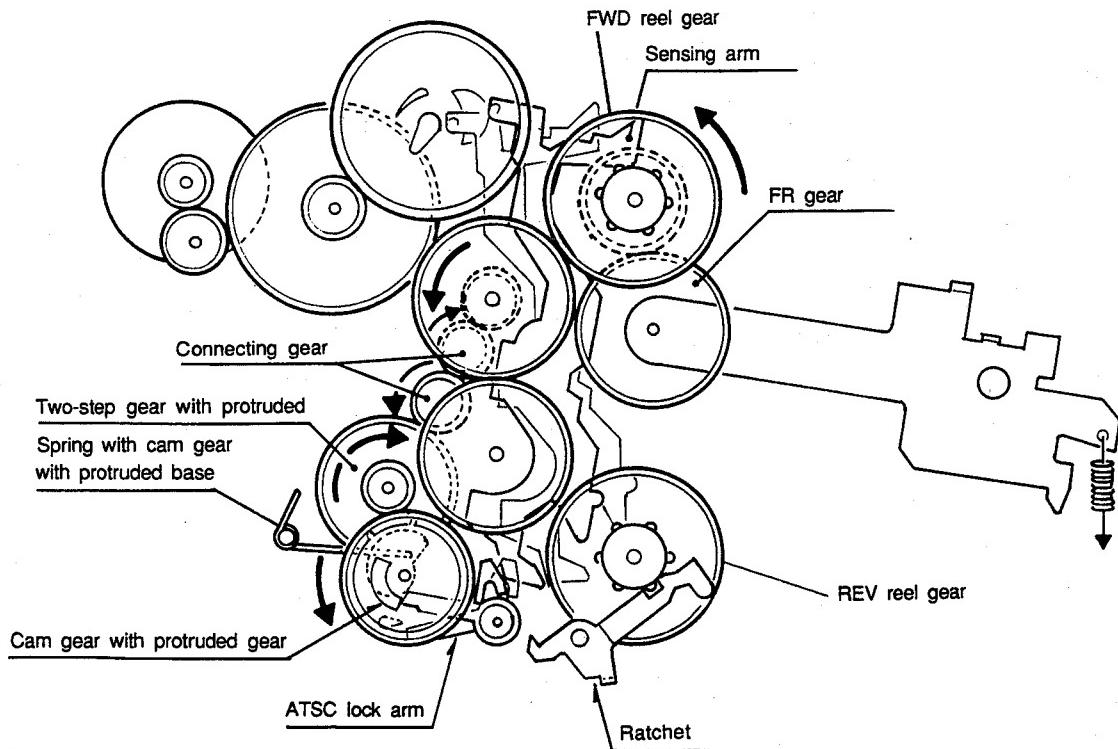
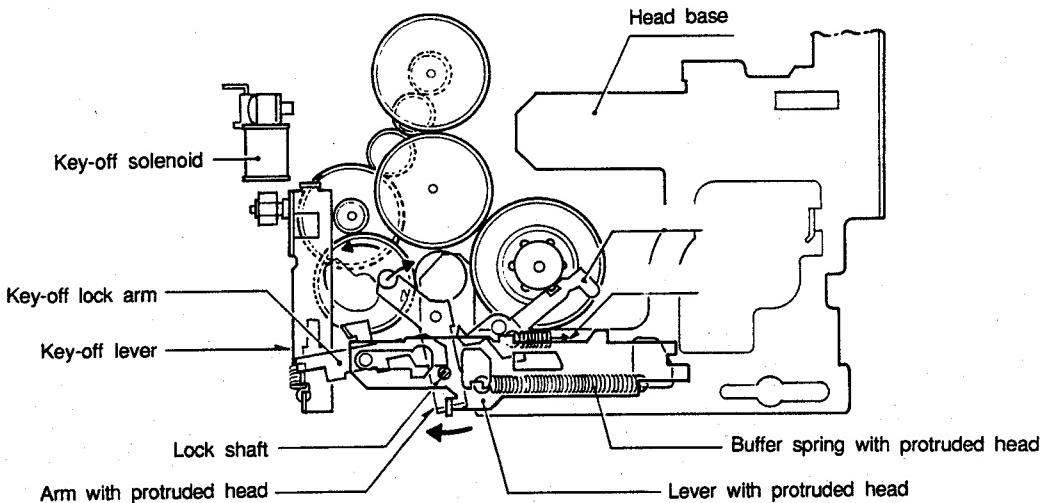


Fig. 18

1. At the position for releasing the head table, the FR gear is meshed with the FWD reel gear. Because the ratchet in the REV reel gear stops rotating, the tape must be wound up until no slack exist.
2. Because the rotation stops when no slack exists in the tape, sensing is performed. The sensing arm presses the ATSC lock arm, and the lock of the cam gear with protruded head gets out of position. Then, the cam gear is made to rotate.

● Key-off Operation

Release Condition



Play Condition

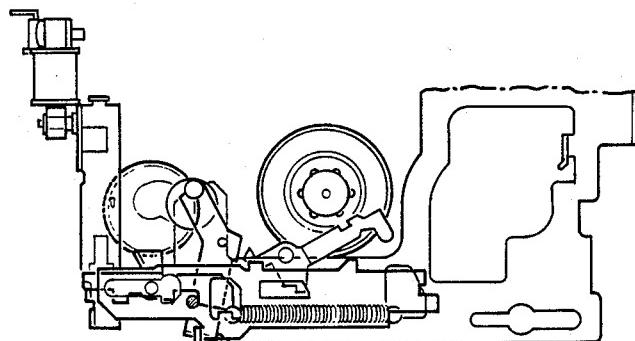


Fig. 19

1. Thrusting head: The arm with protruded head is rotated by the rotation of the cam gear with protruded head, and the lever with protruded head is pushed out. Because the lever with the protruded head and head base are connected by the buffer spring with protruded head, the head base moves forward.
2. Lock for head base:  
When the lever with protruded head moves forward, the lock shaft caulked by the lever with protruded head shifts. Thus, the key-off lock arm can rotate, and the key-off lever reaches the key-off solenoid

by force of a spring, and becomes attached. (Although escape power works on the key-off lock arm by force of the head return spring, the solenoid maintains it.)

3. Key-off:  
The key-off lock arm is rotated by the power of the head return spring when the key-off solenoid is switched off, and the lever with protruded head and head base move back together.

● EJECT Operation

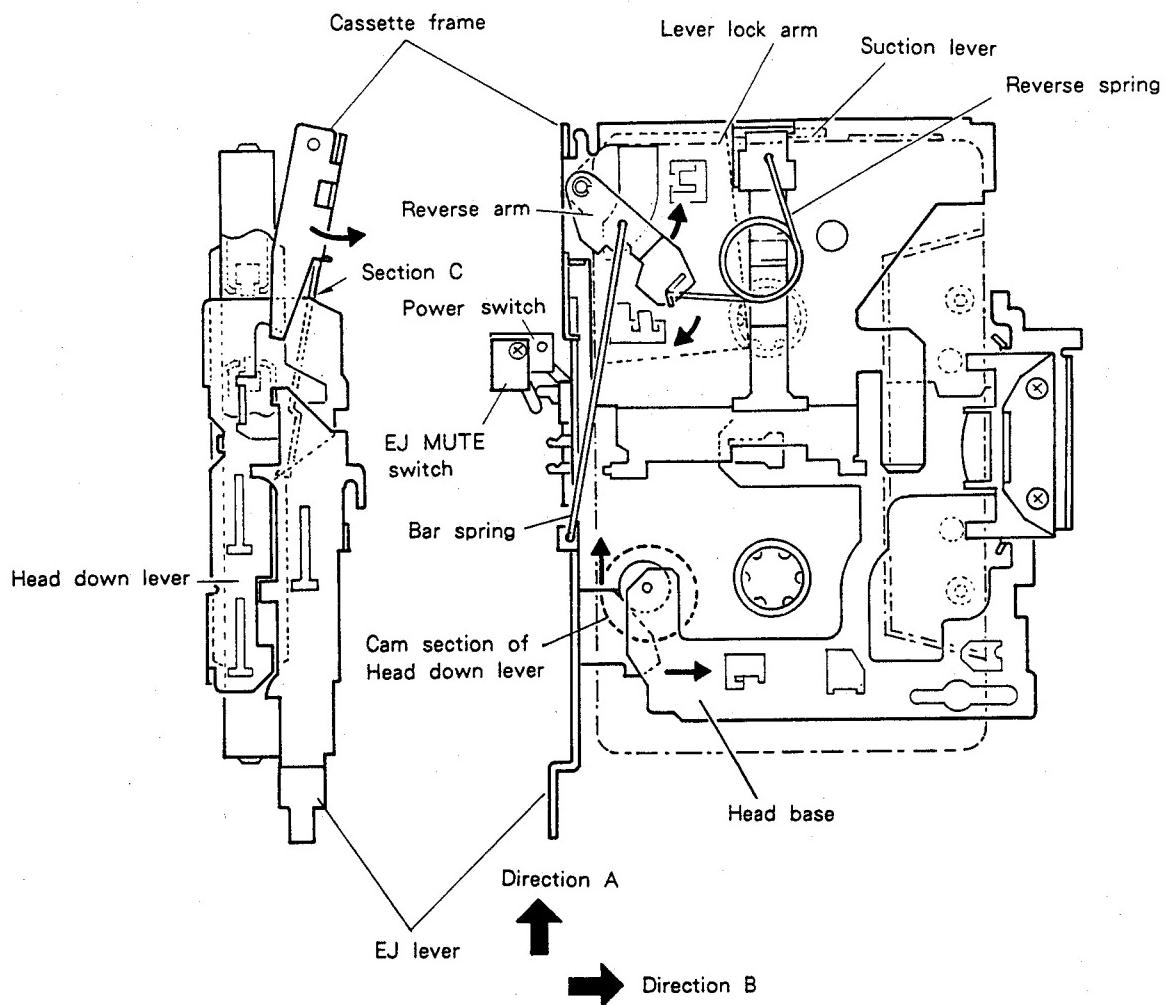


Fig. 20

1. Push the EJ lever in Direction A by hand (EJ MUTE SW ON) At the same time, the head down lever slides in Direction A.
2. The cam section of the head down lever returns the head base in Direction B (head base down operation).
3. Section C of the cassette frame is pushed up by the stroke of the head down lever (push-up operation).
4. The reverse arm is driven in a direction of arrow mark via bar spring by the EJ lever stroke.
5. The reverse spring passes through the reverse position to eject the cassette tape (eject operation).
6. With the EJ lever over-stroking, the lever lock arm can be rotated and locks the head down lever.
7. When released, the EJ lever returns and is stopped by the head down lever.

## **ADDITIONAL**



# *Service Manual*

**ORDER NO.**  
**CRT1428**

# CASSETTE MECHANISM ASSEMBLY

# CX-197

## **NOTE**

- This service manual describes operation of the cassette mechanism incorporated in models listed in the table below.
  - When performing repairs use this manual together with the specific manual for the model under repair.
  - CX197 (CRT1328) does not have a Key-off function, but the key-off function is shown in this service manual of the CX-197 (CRT1428).

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## 1. DISASSEMBLY

*Note: Always use new washer and E washer at the time of reassembling.*

### ● How to Remove the Belt and Motor

1. Remove screw A fixing the FR lever. (Fig.1)
2. Remove three screws B fixing the sub-chassis unit. Move the unit first in Direction A, then in B direction, and lift it upward for removal. (Fig.2)
3. The belt can now be removed. (Fig.3)
4. Remove two screws C. The motor can be removed. (Fig.3)

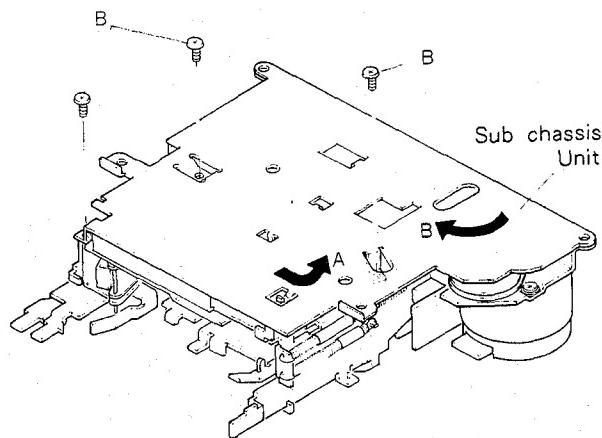


Fig. 2

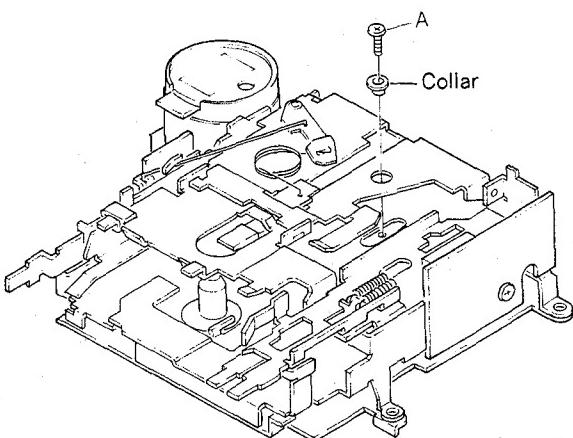


Fig. 1

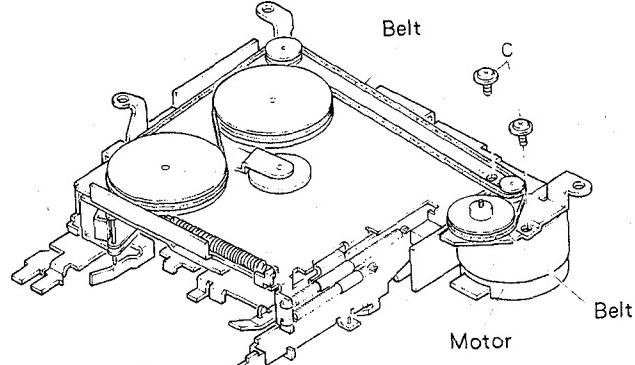


Fig. 3

● How to Remove the Pinch Roller Unit and Head

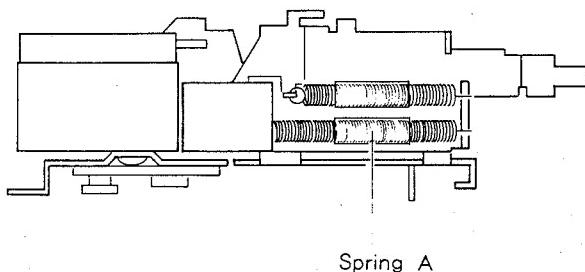


Fig. 4

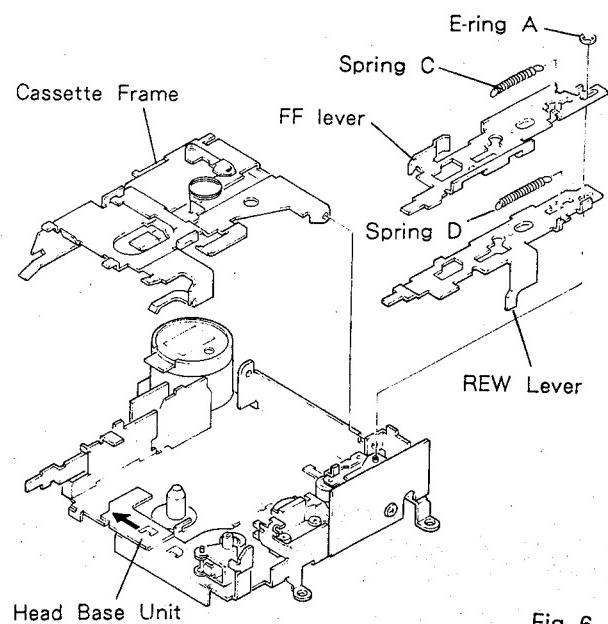


Fig. 6

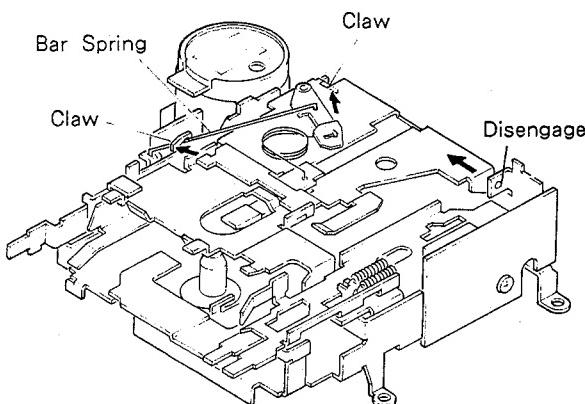


Fig. 5

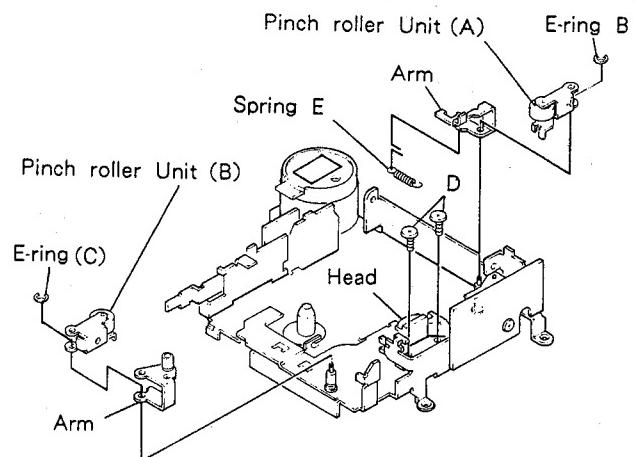


Fig. 7

1. Remove spring A. (Fig.4)
2. Extend claws (2 points). (Fig.5)
3. Remove bar Spring. (Fig.5)
4. Disengage projection by moving in a direction of arrow mark. (Fig.5)
5. The cassette frame is removed. (Fig.6)
6. Remove springs C and D. (Fig.6)
7. Remove E-ring A. (Fig.6)
8. Remove FF/REW levers. (Fig.6)
9. Move head base unit forward. (Fig.6)
10. Remove spring E. (Fig.7)
11. Remove E-ring B. The pinch roller unit (A) can be removed. (Fig.7)
12. Remove E-ring C. The pinch roller unit (B) can be removed. (Fig.7)
13. Remove two screws D. The head can be removed. (Fig.7)

## 2. ADJUSTMENT

### 2.1 CHECK POINTS OF CASSETTE MECHANISM

<p>Confirm the following items when replacing parts of the cassette mechanism.</p>	<ul style="list-style-type: none"> <li>■ Tape speed deviation:  <math>3,000 \frac{+90}{-30} \text{ Hz}</math>  <math>(4.76 \text{ cm/s})^{+3\%}_{-1}</math></li> </ul> <p>Using an NCT-111, measure the speed at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5 — 6 seconds.</p>	<ul style="list-style-type: none"> <li>■ Wow and flutter: Less than 0.2% (WRMS)</li> </ul> <p>Using an NCT-111, measure the wow and flutter at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5 — 6 seconds.</p>
<ul style="list-style-type: none"> <li>■ Fast forward and rewinding time:  100 — 120 seconds</li> </ul> <p>Using a C-60, set to fast forward and rewind, and measure the time with a stop watch.</p>	<ul style="list-style-type: none"> <li>■ Winding torque:  35 — 65 g·cm</li> </ul> <p>Using a cassette type torque meter (100 g·cm), measure the minimum value while in the play mode. Measuring time shall be 2.5 — 6 seconds.</p>	<ul style="list-style-type: none"> <li>■ F.F. torque:  70 — 120 g·cm</li> </ul> <p>Using a cassette type torque meter (120 g·cm), measure the value when the tape stops in the F.F. mode.</p>
<ul style="list-style-type: none"> <li>■ REW torque:  70 — 120 g·cm</li> </ul> <p>Using a cassette type torque meter (120 g·cm), measure the value when the tape stops in the REW mode.</p>	<ul style="list-style-type: none"> <li>■ Back tension torque:  2 — 6 g·cm</li> </ul> <p>After setting in the REW mode without loading a cassette tape for 5 minutes, measure the back tension torque in the play mode, using a cassette type torque meter.</p>	<ul style="list-style-type: none"> <li>■ Cassette loading force:  Less than 0.7 kg</li> </ul> <p>Push the center of the cassette and measure the force with a tension meter (3 kg).</p>

## 2.2 AZIMUTH ADJUSTMENT

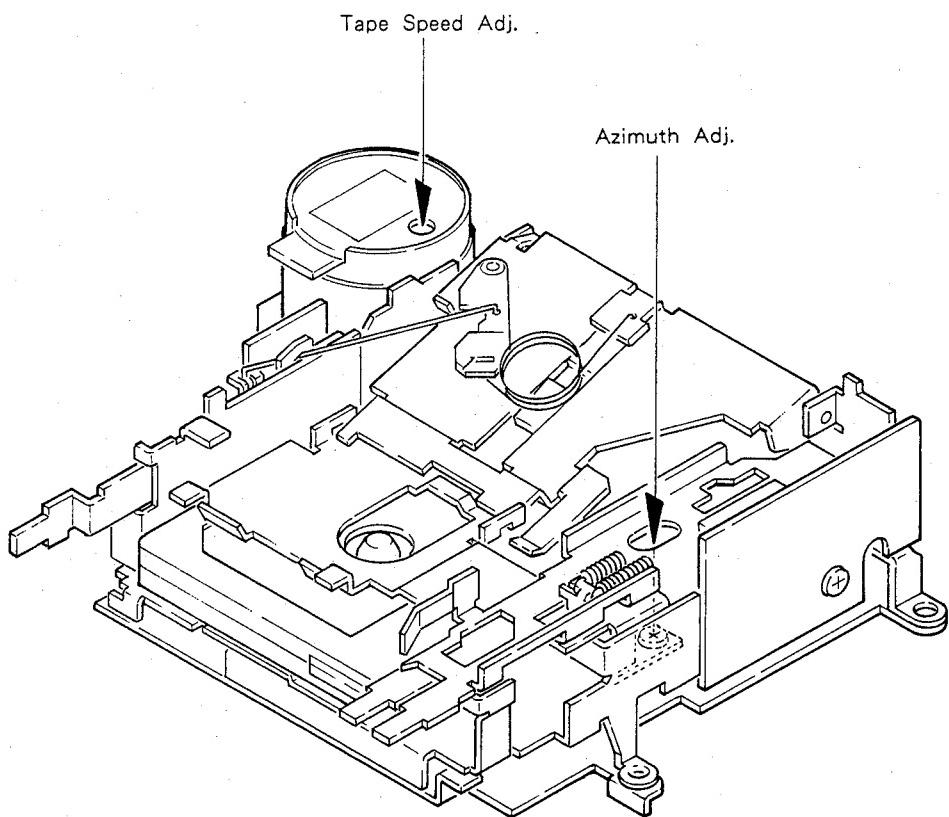


Fig. 8

### ● To Adjust (EXK1750)

1. Play "A" side of NCT-110 (10kHz, - 10dB). Adjust the screw for maximum output in forward and reverse directions.
2. Play "B" side in forward and reverse directions to confirm adjustment.

### 2.3 TAPE SPEED ADJUSTMENT

1. Reproduce NCT-111 (3kHz, - 10dB). Adjust the semifixed resistor so that frequency counter shows 3010Hz (+80Hz, - 40Hz).

### 3. MECHANISM DESCRIPTION

#### ● Loading operation

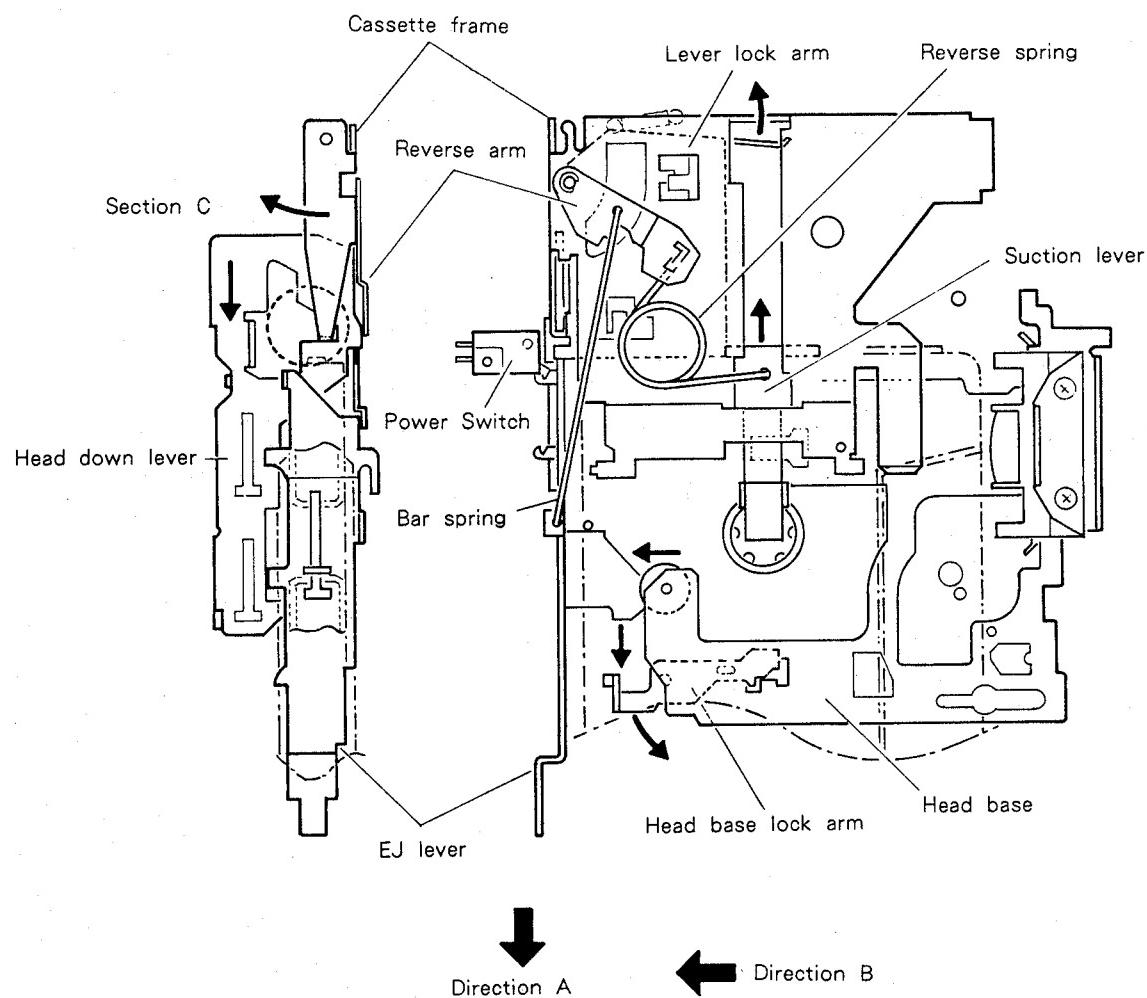


Fig. 9

1. A cassette tape, when inserted, pushes a suction lever. The reverse spring rotates to move past the reverse point. Then, the cassette is drawn by a force of a reverse spring (suction operation).
2. After suction, the lever lock arm is pressed to be unlocked.
3. The head down lever is unlocked and the lever moves in Direction A.
4. While moving, the EJ lever turns ON the power switch.
5. The cassette frame engaged to the section C of the head down lever turns. (Cassette drop operation)
6. At the stroke end, the head down lever turns the head base lock arm.
7. A Stopper of the head base lock arm is released, and the head base moves forward (Direction B).

● MS Operation

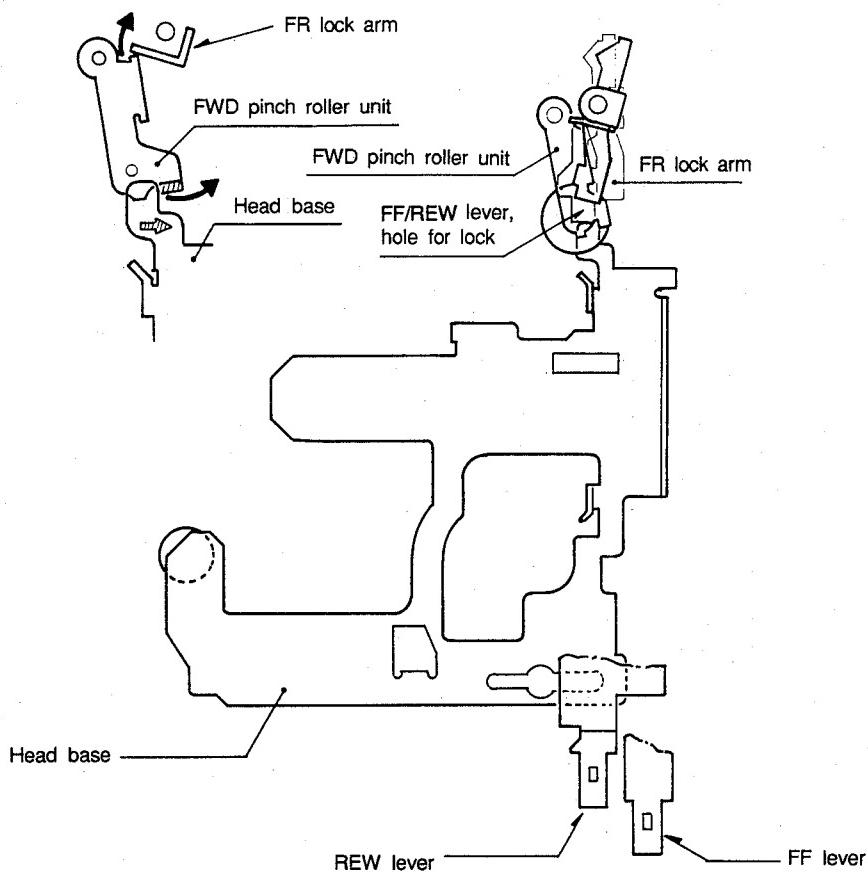


Fig. 10

The head base is moved back by switching the key-off solenoid off from the REW or FF condition, and is lowered (rotated) FWD pinch roller unit. The FWD pinch roller unit presses the bending part of FR lock arm to make it rotate in the direction that releases the lock. The lock of the FF/REW lever is consequently released.

Subsequently, the head comes out from the ATSC to enable PLAY condition.

● Direction Changeover Operation

(1) FWD play operation

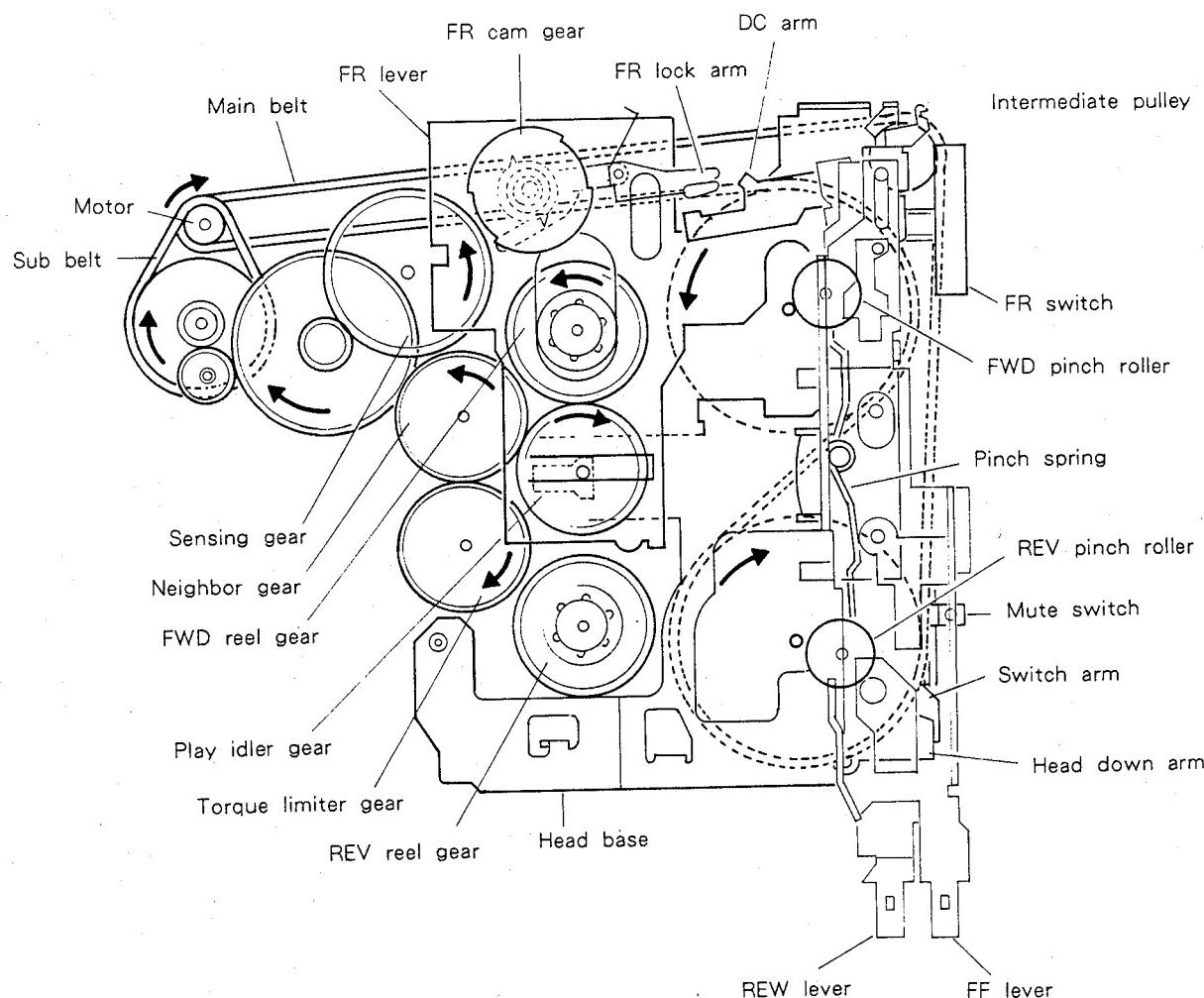


Fig. 11

When the FR lever is in the top position, the pinch spring is in the upper position to press the FWD pinch roller. The FR switch also moves upward and its reaction causes downward force on the FR lever. The spring attached to the FR lever applies upward force to the play idler gear from above to engage it with the neighbor gear and FWD reel gear.

The tape is driven in the FWD direction by a running motor and taken up by the REV reel gear via the torque limiter gear.

(2) Direction change operation

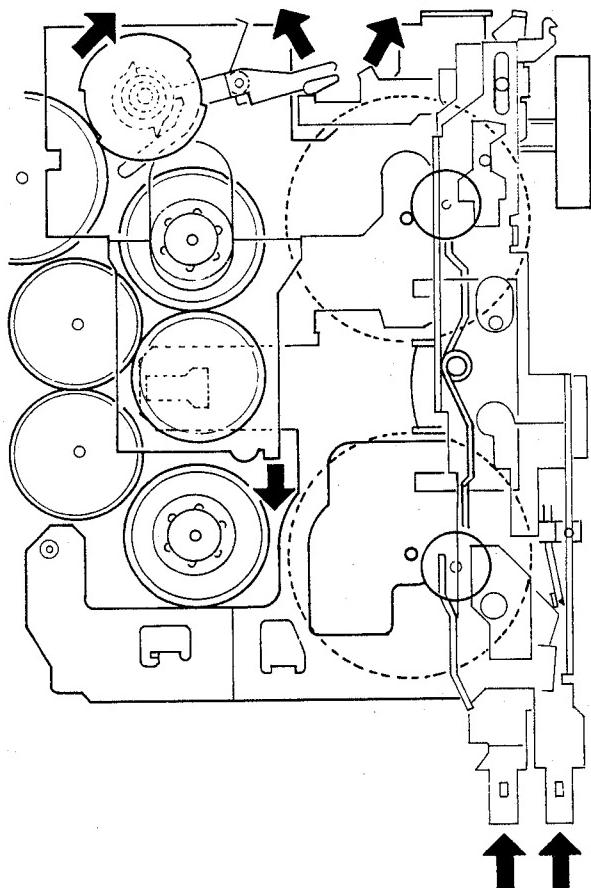


Fig. 12

(3) REV play operation

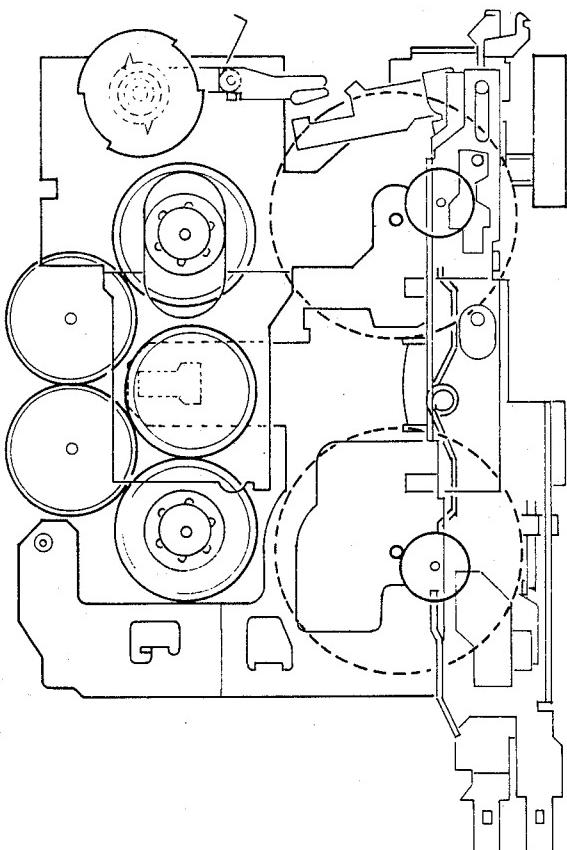


Fig. 13

The direction is changed by pressing FF and REW levers simultaneously. The DC arm turns along a cam groove of FF and REW levers to turn the FR lock arm. As the FR lever applies force from above downward, the FR cam gear turns and the notch meshes with the sensing gear.

As a result, the FR lever moves downward.

When FF and REW levers are kept pressed, the lock arm contacts the outside of the FR cam gear to prevent changeover between FWD and REV. Pressing FF and REW levers also cause the mute switch to be turned ON. In other words, muting is valid while FF and REW levers are pressed. (Fig.12)

Moving the NR lever up and down causes changeover among the pinch roller, FR switch, and play idler gear. With FF and REW levers having been returned, the FR lock arm returns to the normal lock position and locks the gear when the FR gear completes an one-half turn. The mute arm also returns to turn OFF the mute switch. The reverse play state is thus obtained. (The same applies to changeover from REV to FWD.)

● FF/REW Operation

(1) FWD play operation

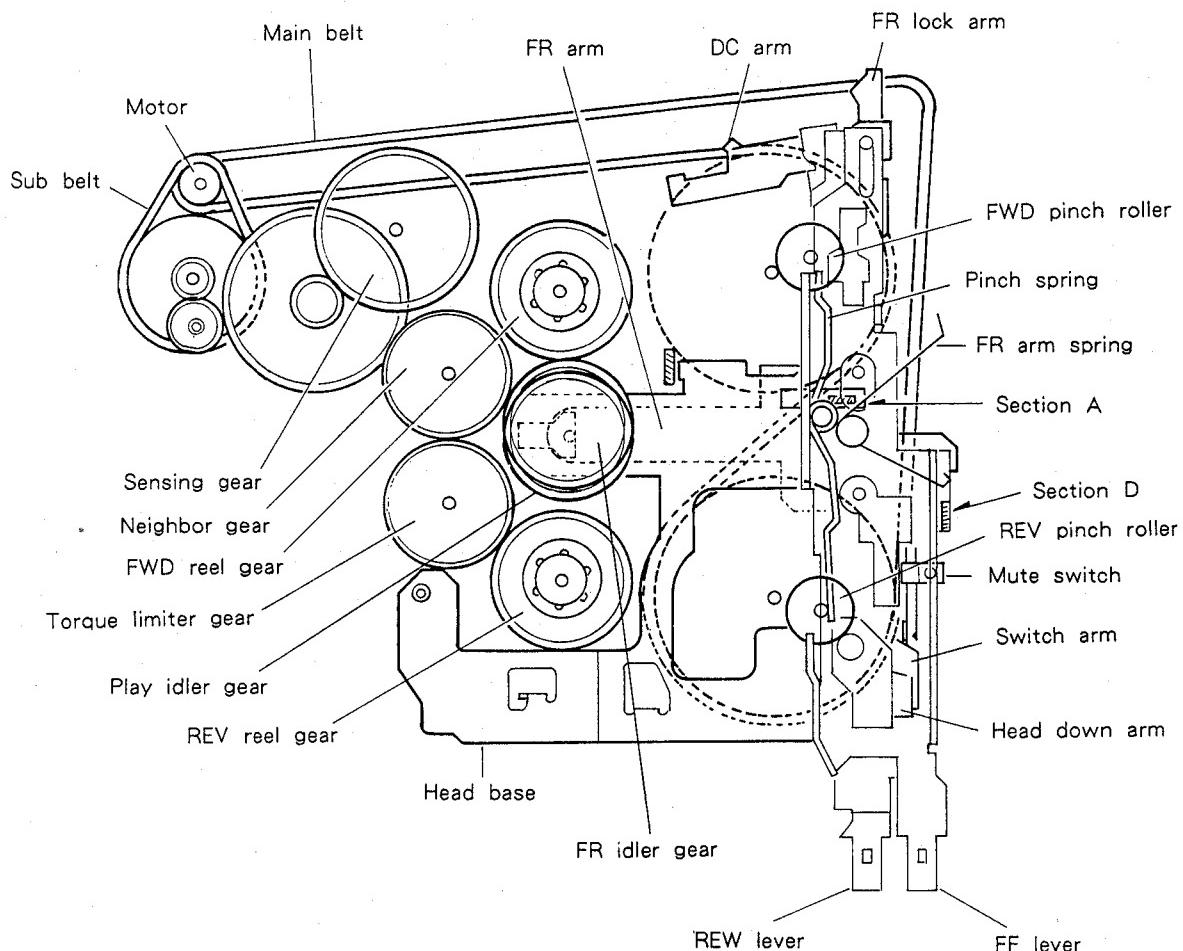


Fig. 14

In the FWD (REV) play state, the head base is fixed by a chassis stopper. The pinch spring presses the pinch roller into contact with a capstan to drive forward the tape. The REV reel gear takes up the tape via the torque limiter gear. In this case, the FR idler gear on the FR arm is centered by Section A of the head base and thus not rotating.

## (2) FF Operation

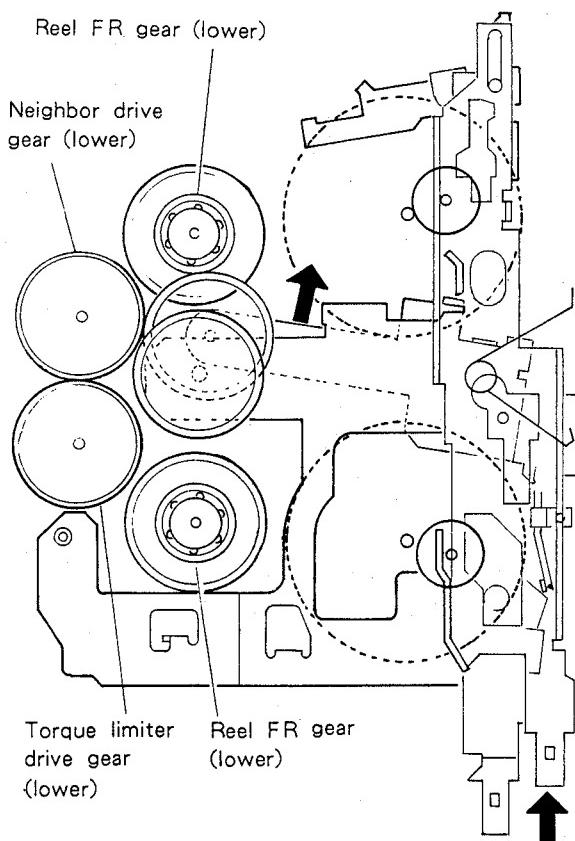


Fig. 15

## (3) REW operation

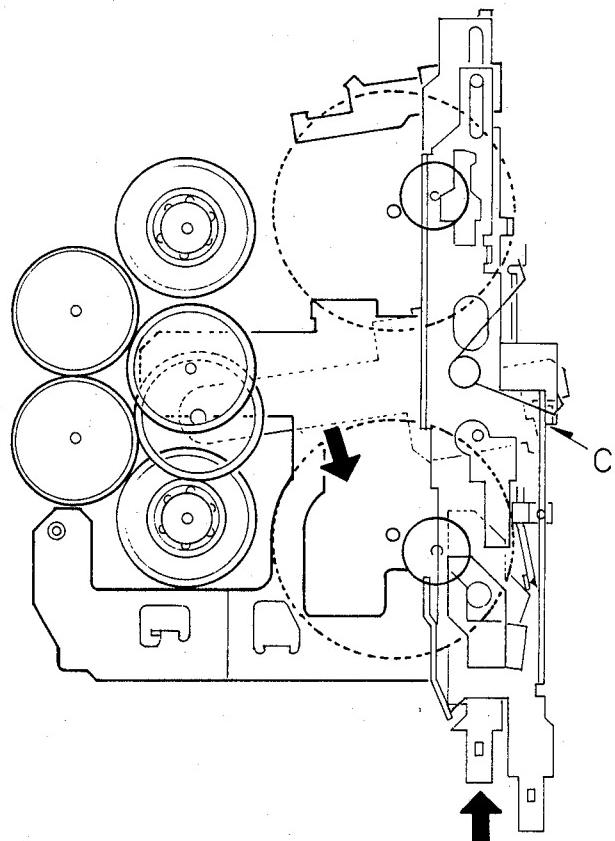


Fig. 16

FF operation is obtained by pressing and locking the FF lever. As the FF lever is pressed, the switch arm turns to turn ON the mute switch. The head base is moved backward along the FF lever cam groove.

As the head base moves backward to release the pinch roller from the capstan, the play idler gear is simultaneously disengaged from the reel gear. As the head base moves backward, the FR arm centered by Section A is put into rotation by the FR arm spring to engage with the FWD side FR gear.

The FF lever is locked by the FR lock arm and performs the FF operation. (Fig.15)

Similar to the case of FF operation, pressing the REW lever causes the mute switch to be turned ON.

Simultaneously with release of the pinch roller from the capstan, the play idler gear is disengaged from the reel gear.

Section D of the REW lever presses a movable side of the FR arm spring, thereby engaging the FR gear to the FR gear on the REV side.

The REW lever is locked by the lock arm, performing the REW operation. This operation is cancelled when Section C is turned by the lever return spring. (Fig.16)

● Sensing Operation

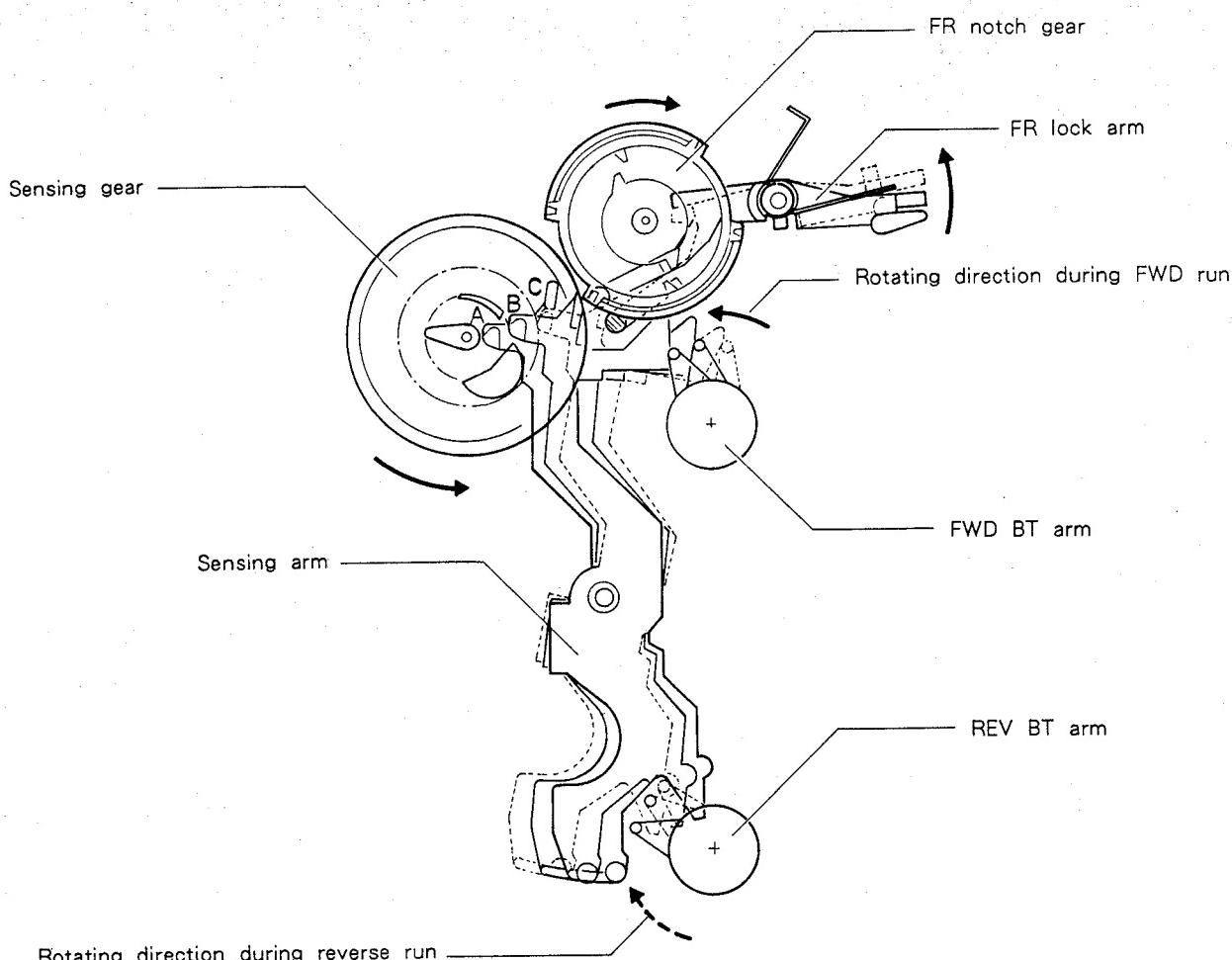


Fig. 17

1. During tape run: The sensing arm keeps oscillation between A and B under a force of the FWD BT arm (or REV BT arm).
2. At end of tape: The force of the BT arm is lost. The sensing arm stops at Position B, then pushed out to Position C by a crescent cam of the sensing gear.
3. Change of run direction: The FR lock arm turns counter-clockwise along with movement of the sensing arm. The FR notch gear is unlocked and begins to turn.